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The Dry Dock.

BY T. M. BROWN.

Facilities for the care of damaged vessels, which have culminated in dry docks, developed gradually and in much the same manner as did those for the aid of wounded mankind. Primitive man received all the crude treatment given him for injuries wherever he happened to be at the time of the accident. When his descendant of today suffers dangerous cuts or bruises, broken or fractured bones, he is repaired in the surgical ward of a hospital. A shipyard may be considered as a vessel's hospital, of which the dry dock is the surgical ward, sought by the ship compelled to leave its native element on account of its hull having sustained injuries similar to those mentioned.

In olden times if repairs to the hull were needed and the vessel was in waters affected by the rise and fall of the tide, she was grounded at high tide to be exposed at the ebb, when repairs were commenced and hurried as much as possible before the tide again came in. If, however, there was no tidal movement where the ship happened to be, it became necessary to haul her on the beach and careen her in order to get at the injury.

Although the largest boats of those days were insignificant in size, compared with an ordinary vessel of the present time, it was an exceedingly hard proceeding to beach them and our forefathers invented an easier plan. This was called heaving down and consisted of attaching ropes to the heads of the masts and to stationary objects on shore or to the deck of another vessel and then hauling the boat

to be repaired into an almost horizontal position.

Although dry docks had come into use, such a process was the cause of the famous catastrophe to the Royal George in 1782 whereby 1,000 people were drowned and which was such a national calamity that it was perpetuated in verse by Cowper, the celebrated English poet.

The Royal George, carrying 100 guns, was the finest and most powerful vessel in the English navy and the flagship of Rear Admiral Kempenfeldt. She was lying off Spithead at the time of the memorable disaster, awaiting final orders previous to sailing for the relief of Gibraltar, then beleaguered by combined French and Spanish fleets, when she sprang a slight leak. Not wishing to lose time by returning to the harbor and the weather being fine, the heaving down process was resorted to. Through a miscalculation she was laid over more than was intended and a sudden gale which came up threw her upon her side. As her lower deck ports were open, she immediately filled with water and in three minutes went to the bottom and with her went much of a nation's pride and hopes.

Designing the Gridiron.

The next improvement in handling damaged vessels seems to have been the designing of the gridiron. A framework of timber was built at a level sufficient to admit of vessels being floated above it at flood tide and grounded upon it during the ebb and when thus left high and dry every part of the hull was easily reached for inspection and repair.

The use of slips or marine railways appears to have been adopted at about the same time as that of gridirons. A slip consists of a carriage or cradle working upon an inclined railway which extends above high water to a sufficient distance for the class of vessels expected to use it and to several feet below the level of low water. The carriage is let down under the water, the vessel is floated above it and the carriage drawn up until the vessel catches it forward. After the ship is in line with the carriage, a steam winch hauls the carriage with the ship upon it out of the water. In early days a grab purchase performed the work now done by the winch.

As larger ships came into use, dry docks or graving docks as they are termed in England, closely followed and superseded gridirons and slips, the former not being employed in these times at all and slips only in the building and repair of yachts and small vessels.

Dry Dock or Graving Dock.

A dry dock is an excavation on the shore of a body of water and connecting with it at right angles. The sides are constructed of timbers or masonry and formed in steps or altars, so that the shape of the dock is similar to that of the vessels but with space left for workmen and light. The entrance is closed by strong and huge gates opening sideways like a lock or falling upon the bed of the entrance or else a caisson is used.

If the dock is situated upon a tidal body of water, the vessel is floated in at high tide and the water is allowed ordinarily to run out through sluices

with the ebb of the tide. As it escapes the vessel slowly settles until she reposes upon the keel blocks at the bottom of the dock, with her sides supported by timber struts and shores resting upon steps previously mentioned. Should the dry dock be located on a nontidal body of water the dock is pumped out by means of large centrifugal pumps after the ship enters.

When the two new docks projected for the great lakes are completed there will be upon the great lakes, 13 dry docks measuring over 500 ft. in length.

This is conclusive evidence of the high development of the ship building and marine industries of these inland seas when it is considered that on the Atlantic and Pacific coasts of the United States and Canada combined, there are but ten docks of equal size.

There are but five dry docks in the world larger than the 750-ft. dock at Lorain on Lake Erie. Of these, the largest is at Liverpool and is 925 ft. in length, the one at Glasgow is 880 ft., that at Tilbury is 875 ft., the one at Belfast is 800 ft. and the one at Newport News, Va., is 860 ft. in length.

Largest Dry Dock in the World.

The distinction of possessing the largest dry dock ever built, now held by Great Britain, will soon be wrested from her by the United States as there is in course of construction at San Francisco a concrete dock which will measure when completed, 1,050 ft. in length, 144 ft. in width at the top and 40 ft. at the gate. This dock will be eclipsed in size, however, by the dock which will be constructed by our government at Pearl Harbor, Hawaii. Its length will be 1,195 ft. and by means of caissons it will be possible to divide it into an inner and outer dock, an innovation so far as American docks are concerned.

Dry docks are very expensive structures, but the cost of those built by private concerns for public use is quite moderate when compared with that of government docks for navy purposes. The naval dock at Boston which is only 253 ft. long and 86 ft. wide, completed in 1833 when labor and material were cheap, cost \$700,000. The Brooklyn navy yard dock, finished in 1851 and the finest in the world at that time, cost complete with machinery \$2,000,000. This dock is 307 ft. long by 98 ft. wide and has walls of solid masonry 36 ft. wide. The Mare Island Dock, near San Francisco, was under construction 12 years and represents an expenditure of over \$3,000,000.

The rapid and constant increase in the size of vessels has compelled the building of dry docks of the immense sizes mentioned within a comparatively recent period. The huge ocean liners and mighty lake freighters of the present day could no more get into the docks of twenty-five years ago than a man could squeeze himself into the garments of his five-year-old son.

Except upon the Great Lakes, however, the docking facilities have not kept pace with the demands of modern shipping. This is due not only to the enormous expense of the land sufficient for dry dock purposes, of excavating same, of building the walls and gates, of installing machinery and of the constant repairs necessary, but also to the oftentimes insurmountable engineering difficulties met with in a project of this kind. The location most available and convenient for a dry dock is often so low and marshy or sandy and porous as to entirely prevent its construction or at least at a prohibitive cost.

The Floating Dry Dock.

The efforts to overcome these difficulties have proved the truth of the old adage that, "necessity is the mother of invention." The invention in this case is that of the floating dry dock and of the hydraulic lift dock. The latter is in use at present only on the sea coasts and is a modern development of the gridiron. It consists of a submerged platform, over which ships are floated at high tide but differs from its ancient prototype in that instead of the ships settling on the platform as the tide recedes, the platform approaches the ships immediately, from below, and elevates them above the surface of the water without having to wait for the tide to ebb. The finest example of this variety of dock and one which has attracted world wide attention from engineering experts as a triumph of their profession, both as to construction and the application of hydraulics, is that of the Union Iron Works at San Francisco, Cal.

Owing to the fact that their plant is located on a mud flat, it was impossible to construct a dry dock and as it was absolutely necessary to have some means of docking vessels for extensive repairs, their famous lift dock was designed. Piers were constructed consisting of twenty-two iron cylinders, thirty-six on each side, in which piles 100 ft. long were driven; the cylinders extending several feet below the bottom of the water. These were used to prevent the destruction of the piles by the ship worm which, in San

Francisco harbor, is ruinous to vessels' hulls and other submerged wooden structures. Each cylinder is crowned by a heavy iron cap, and two heavy steel girders, extending the full length of the dock on either side and resting on the cylinders, complete the piers.

On each of the piers are eighteen hydraulic rams, 30 in. in diameter with a stroke of 16 ft., which are suspended between the cylinders by immense castings attached to the pier girders. On top of each ram is a heavy pulley, six feet in diameter, over which pass eight steel cables, each two inches in diameter. One end of each cable is secured to the bed plates supporting the hydraulic rams, while the other is attached to the side girders of the lifting platforms which is thus suspended between the two sets of rams by 288 cables. Each cable has been tested with a load of 80 tons, so that the platform is therefore capable of lifting 21,000 tons. It is built of cross and longitudinal steel girders and is 62 ft. wide and 440 ft. long.

The rams are operated by four immense steam pumps and every operation of the dock has been so scientifically arranged that for each one foot movement of the rams, the platform rises two feet, thus giving a total rise of 32 ft. which elevates the platform 10 ft. above the water at high tide.

Feature of Union Iron Works' Dock.

A regulator attached to the pumps controls the throttle valve of the engine operating them, and as the ship leaving the water becomes heavier on the platform and a greater strain on the rams and consequently on the pumps, this regulator causes the engine to speed up to meet the additional requirements until the full pressure of 1,100 lbs. per square inch is attained.

An automatic arrangement controlling the movement of the rams, insures the raising of the platform on an even balance, as otherwise, an unequal distribution of the load upon it would cause the rams carrying the portion bearing the least weight to rise more rapidly than the others with disastrous results.

When the platform is elevated to the full stroke of the rams, a line of locks on top of the foundation girders on each side are shoved under the platform by automatic hydraulic machinery and the platform lowered onto them, thus relieving the rams and sheaves of their heavy burden until the work on the ship is completed, when the platform is again lifted, the

locks removed and the platform with its load lowered into the water.

The ingenious devices everywhere in operation about this dock, extend even to the bilge blocks which support the ship while out of the water, they being applied by a clever arrangement of pawls and ratchets.

The hydraulic lift dock possesses, more nearly than any other style of dock, the advantages of dry docks on account of its proximity to the shore; repair material being readily transferred to it without expense, loss of time or effort. It can be used, however, only where dredging can be done and piers of reasonable length constructed. Where conditions are not favorable for its operation, the floating dry dock is the last resort.

Advantage of Floating Dock.

Roughly described, a floating dock is a steel structure consisting of a series of floating platforms, composed of large watertight tanks, attached to the base of high, hollow, floating walls on each side, there being no end walls.

On top of the high, broad walls are power houses for operating the big centrifugal pumps which fill the pontoons and side walls with water, or remove it at a rate sufficient to raise a 12,000-ton battleship clear of the level of the ocean in less than two hours. They also produce electric light and furnish power for the hauling machinery and mighty cranes which run along each wall from end to end.

When a ship is to be docked, water is admitted into the pontoons and the side walls until the entire structure is sunk to any desired depth. The vessel then rides through between the walls of the dock and over the submerged pontoons until in place, when the water is pumped out from the pontoons and the walls which rise from their natural buoyancy, bringing with them and elevating the vessel.

The whole dock, both pontoon and walls, is divided into sections separately connected with the pumps and water may be admitted or removed from the various sections with ease in maintaining an even keel for the vessel being raised.

When there are two walls to a floating dock it resembles a dry dock in form and being U shaped is known by that name, but there is another style of this dock, known as the L or offshore dock, which has but one upright wall. This is attached to the shore by parallel booms, or in a similar manner to prevent it from listing or tilting over when the hori-

zontal pontoons are supporting a load. The offshore dock is thus restricted, like the hydraulic lift dock, to some comparatively sheltered place, while the U dock, being independent, may be towed from place to place and used almost anywhere.

This is its great advantage over the various styles of docks already mentioned. Shipping business may decline at one port and spring into life at another and when it so happens, the floating dry dock can transfer its usefulness to the new field of action, whereas, that of the other docks is ended until a return of prosperity. So, also, when a vessel is desperately wounded, either in peace or war, at some distant place and it is impossible to remove her in her damaged condition, the floating dry dock can be rushed to the scene of the accident as a marine ambulance and first aid to the injured be administered to the disabled vessel or it can convey her to a port where complete repairs may be made.

The latter proceeding is entirely practicable, so far as the stability of the floating dock is concerned, as tests have proved that it is over 20 times as stable as a ship.

The naval authorities of the world seem to be almost alone at the present time in their appreciation of the true value of the floating dock.

This is surprising when its many advantages for mercantile marine purposes are considered.

It can be constructed more quickly and at a much more accurately calculated price than a dry dock.

It can care for vessels longer than itself, owing to the fact that the heaviest portion of a vessel is in the center and the bow and stern of a vessel longer than a floating dock suffer no strain by projecting over the floor of the dock. The usefulness of a dry dock in this respect is limited to its own length.

Cost of Dock Service.

The cost of dock service can be more equitably adjusted by the use of the floating dock than by that of the dry dock, as the chief item of cost in dry dock operation is in pumping out the dock. It is as expensive to do this for a small boat as for a large one and therefore the small boat pays a proportionately higher rate than the larger one does. In the case of the floating dry dock this is changed by reason of the fact that the dock need only be sunk to the draught of the boat to be docked and consequently there is pumpage only in proportion

to the size of the vessel served, which can be charged for accordingly.

When the ship is elevated by the floating dock, the air getting free circulation around it, in a manner impossible in the dry dock, more quickly dries the slime and marine accumulation on the hull and thereby promotes quicker dispatch in repair work. The workmen also work more comfortably in the light and air afforded by the floating dock and in the winter their comfort is increased by steam pipes beneath the floor of the dock.

The only point of superiority in the dry dock, as compared with the floating dock, as a usual thing, are its durability and proximity to the shops and machinery necessary in ship building and repairing. The latter point is of importance in the saving of labor, time and expense in moving the heavy material and machinery which go into the vessel under repair. It would seem, however, that the lighterage and other charges incidental to transferring repair material from the shore to a floating dock, are amply compensated by the many advantages of this dock.

Floating Dock of the Great Lakes Engineering Works.

The great lakes, ever abreast of the times in matters of shipbuilding, can boast of one of the largest and finest floating docks in existence devoted entirely to mercantile marine work, and which is approached in size by but one other in commission at the present time in the United States.

It is owned by The Great Lakes Engineering Works, at Detroit, Mich., and is 600 ft. long and 105 ft. between the walls. It is not only long enough to accommodate the largest vessels on the lakes, but also the largest flying the American flag on either ocean, either merchantman or battleship. In this connection it may be said that there are but two ocean going United States vessels longer than the largest Great Lakes vessels and but 16 of greater tonnage.

The most powerful, although not the largest, floating dry dock in the world is the United States naval dock Dewey, stationed in the Philippines. It is 500 ft. long, 100 ft. between walls and has a draught of 32 ft. Its lifting capacity is 16,000 tons and it cost \$1,124,000, exclusive of the expense of towing it to the Philippines. This item of expense would have been much greater, however, had not the government been compelled to do the towing itself.

The largest towing firm in the world refused to undertake the gigantic task

of moving this immense, unwieldy mass of metal across the Atlantic Ocean, the Mediterranean, the Indian Ocean and the China Sea and underwriters refused absolutely to assume any risk.

Floating Dry Dock Dewey.

The feat of transferring this greatest floating thing that had ever took the water from the time of Noah, was the most notable naval feat from the time that the Oregon's band played the "Stars and Stripes forever" in Havana harbor after her memorable dash around the Horn in 1898, until Fighting Bob's white fleet commenced its triumphal tour of the Pacific this summer.

The appearance of the Dewey on its voyage, with its smokestacks towering above its high walls, has been described as that of a factory roaming around looking for a site. It was an object of curiosity to the mariners of the world and at times was taken for a great marine monster. The Lascar crew of a British East India man, making it out in the half light of dawn, became panic stricken at the sight of the "sea monster with many eyes, chasing three ships which could not escape," (these being the towing vessels). After holding weird, mystic ceremonies to cast off the spell of the floating monster, they sacrificed a sheep in joy of having escaped from it.

The next largest naval floating dock is that of the British government at Bermuda, then follows our own dock at Algiers near New Orleans.

The docks at Rotterdam, Havana and Amsterdam then follow in respective order, according to size.

There has recently been launched on the Tyne, in England, for Callao harbor, a floating dock of three sections, 385 ft. in length, capable of being enlarged by addition of a fourth section to 510 ft. The towing firm which refused to tow the Dewey, has contracted to deliver this dock at Callao, encouraged, no doubt, by the success of our own government in the undertaking which they declined.

If they succeed in safely traveling with this dock, the 11,000 miles to Callao, via the Straits of Magellan, it will be a feat second only to that of towing the Dewey and the outcome is awaited with much interest.

Robert Palmer & Son, Noank, Conn., have just been awarded a contract for the construction of five large sand scows, work on which will be begun at once.

NEW TYPES OF BATTLESHIPS.

The board of construction of the navy department is now designing three new types of battleships, for two of which a battery of eight 14-in. rifles is contemplated. The third design according to the preliminary plans, will carry 12 12-in. guns. The tentative plans for the ships carrying 14-in. guns call for a displacement of 25,000 tons. The third type, according to these plans, is to have a displacement of 26,000 tons in order to enable her to carry the 12 12-in. guns, as compared to the 10 of the North Dakota and Delaware, now building.

The thickness of the side, turret and barbette armor of the 26,000-ton vessel will be slightly less than that of the new 14-in. gun battleship. The calculated speed is of 20 $\frac{1}{4}$ to 20 $\frac{1}{2}$ knots under trial conditions of load, and but little less at deep load displacement. It was a question of having 12-in. guns on these new vessels, disposed as on the North Dakota and Delaware, which could be done without delay, or of having 14-in. rifles on the Florida and Utah with a delay of about six months. The Newport conference approved both recommendations, and in the future battleships would be equipped with the design for four turrets of 14-in. guns. Both the Delaware and the North Dakota, 20,000-ton vessels, now under construction, will be the largest vessels up to the present time in the United States navy. They each have 10 12-in. and 14 5-in. guns in their armament, and are designed for a speed of 21 knots. The bureau of ordnance is preparing for the manufacture of 14-in. guns. Rear Admiral Mason, chief of the bureau, asks congress for a small appropriation to enable the naval gun factory to prepare for the work.

PASSING OF THE SQUARE-RIGGER.

For many years past Puget sound has been the foremost American port in the volume of American shipping engaged in its foreign carrying trade. American ships built up the foreign trade of this port and have long maintained a supremacy in it, a supremacy which is rapidly passing, owing to the impossibilities of withstanding the fierce competition of cheaply manned and subsidized foreign ships.

In sailing vessels particularly this port has been the last refuge for American shipping, but the sailing vessel is passing. Within the present week the first of the fleet of square-rigged vessels which have been carrying lumber from American mills to our foreign customers has been sold,

to be dismantled and to be used as barges for carrying stone. Six large square-rigged vessels, the last of a once splendid fleet, have been sold for this purpose, because there is no longer profitable business for them to do. They are sold because they cannot pay the cost of operation. The government of the United States, to save a few dollars in the cost of transportation, has sent out into the waters of the Pacific a great fleet of foreign vessels, carrying coal from one American port to another in direct violation of the laws of congress. These vessels, having discharged their coal, have taken charters here at lower prices than the cost of operating American ships, and the American ships have lain idle, until now they are to be dismantled and become barges.

The president of the United States in his messages to congress has repeatedly urged the necessity for legislation to revive American shipping. The Republican party in its national convention has adopted party platforms advocating legislation to restore American shipping. Yet no department of the government will employ an American ship to do the carrying for the government if a foreign ship can be found to do the work cheaper.

No foreigners are invited to compete for the construction of our warships. No foreign manufacturer is invited to furnish bids to supply the government with articles needed for use in any department. The principle of protection is applied in every department of trade and industry, save to the one industry which is languishing on the verge of absolute extinction.

Abandoning all idea of direct assistance in money from the federal treasury, American ship owners would be glad to ask and receive nothing else, on this coast at least, save the privilege of doing the government carrying on the ocean at a fair price. They can keep their ships afloat if this is given them. But the government in all of its branches, seeking to save a few dollars to make a book showing, gives the foreign tramp the business and lets American ships lie idle or be dismantled, while none others are building to replace them.—*Seattle Post-Intelligencer.*

Capt. Fred St. Louis Dean of the Richelieu & Ontario Navigation Co.'s fleet, died at Montreal last week at the age of 89 years. He retired in 1904 after 58 years of continuous service in the country.

ITEMS OF GENERAL INTEREST.

The Institute of Naval Architects will meet at 5 Adelphi Terrace, London, on Wednesday, March 31.

The welcome home of the Atlantic fleet will take place on the morning of Feb. 22 at Hampton Roads. The fleet left Hampton Roads for its cruise around the world on Dec. 16, 1907.

John J. Townsend and Henry M. Atkinson have been appointed ancillary receivers for the Brunswick Steamship on the petition of the Atlanta, Birmingham & Coast Railway Co., which has a claim against the company for \$118,124.57.

The steel barge Blaskwood has been delivered by the builders to the Lehigh Valley Railroad Co. This is the third barge of this type already delivered on an order for several to be used in the coal trade between Perth Amboy and New York and other coast points.

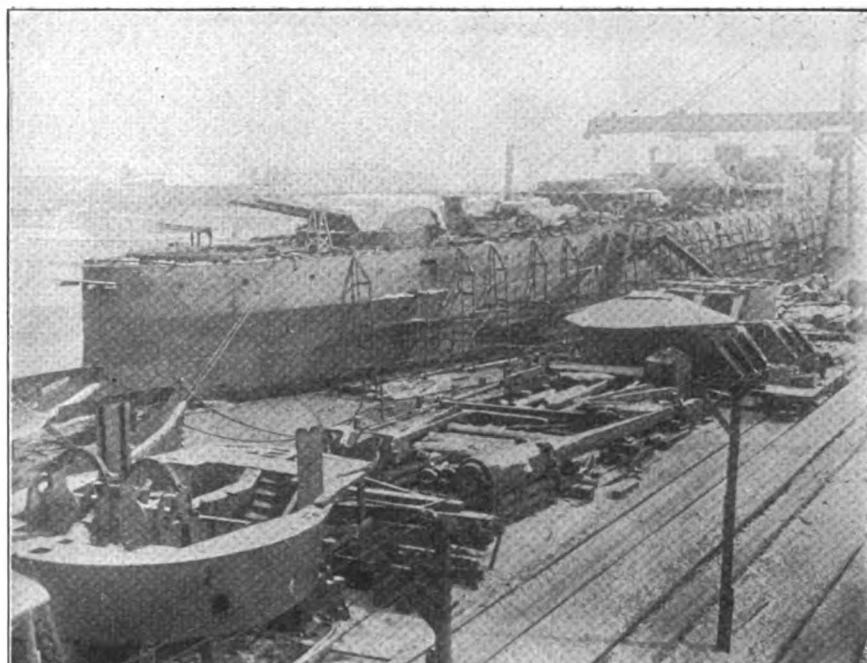
The third international conference on maritime law will be held at Brussels, Belgium, during the autumn of the present year. The secretary of state has petitioned congress for an appropriation of \$5,000 to defray the expenses of the United States delegates to this conference.

At a recent conference of the agents of various steamship lines engaged in Mediterranean trade with New York it was decided to keep freight rates at the present scale but the passage money for third class was raised \$3. After March 1 it will therefore be \$28, \$30 and \$33, according to the class of vessel chosen.

An amendment to the naval bill has been offered by Senator Newlands providing an appropriation of \$12,000,000 for the construction of auxiliary ships such as transports, dispatch boats, cruisers and scouts that may be necessary in time of war. The amendment provides that in time of peace these vessels shall be leased for commercial purposes.

Meetings in the interest of the American merchant marine were also held at Indianapolis on Feb. 5, and at Cincinnati on Feb. 6. Both meetings were addressed by Congressman Humphreys, of Washington, and Congressman McCleary, of Minnesota, and at both meetings stirring resolutions in behalf of the upbuilding of the merchant marine were adopted.

Ward & Sons, Seattle, Wash., are to build a schooner for the United States Trading Co., for use in the coasting trade in Alaska. The vessel is specially designed for work in the north. She will be 52 ft. long, 13 ft. 6 in. beam and 4 ft. 6 in. draught. She will have



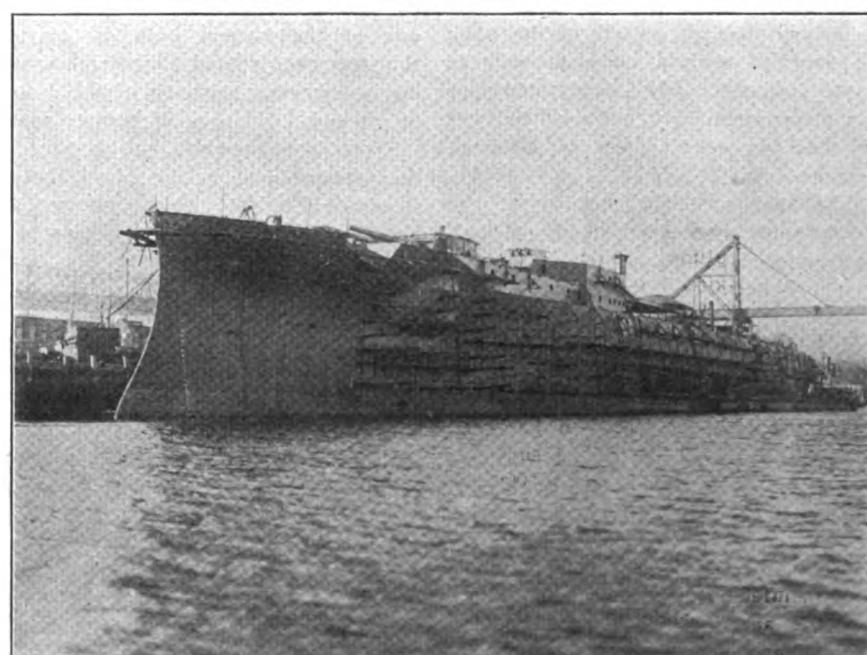
PHOTOGRAPH OF BATTLESHIP NORTH DAKOTA, TAKEN AT FORE RIVER YARD ON FEB. 1, SHOWING HER 70.6 PER CENT COMPLETED.

a sail area of 1,500 sq. ft. and will be powered also with a 25 H. P. Union gas engine. A unique feature of this vessel will be the installation of a "crow's nest," to be fitted to the main mast, and from which the vessel can be steered. This is for the purpose of permitting the navigation of the vessel in ice fields, as the leads in the ice can be observed more readily.

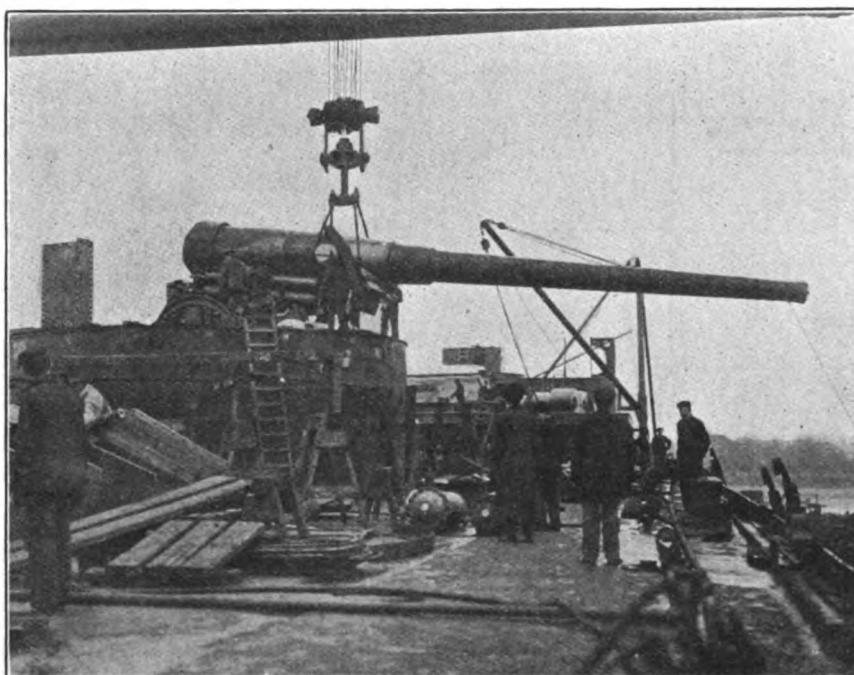
The James Rees & Sons Co., Pittsburgh, Pa., has just shipped in sections to Egypt for work on the Nile

river a steel steamer 140 ft. long, 26 ft. beam and 4½ ft. deep, equipped with a compound engine and three boilers. The steamer is of the stern-wheel type. It required 10 freight cars to transport the vessel to the seaboard.

The steamboat John H. Starin, owned by the Starin Transportation Co., of New York, sprung a leak in Long Island Sound while bound from New Haven to New York, Feb. 19, and sank outside the breakwater at



PHOTOGRAPH OF BATTLESHIP NORTH DAKOTA, TAKEN AT FORE RIVER YARD ON FEB. 1, SHOWING HER 70.6 PER CENT COMPLETED.



MOUNTING 12-IN. GUN IN NO. 3 TURRET OF THE BATTLESHIP NORTH DAKOTA AT THE FORE RIVER YARD ON FEB. 13.

Bridgeport, Conn. The crew of 22 men and the stewardess were rescued by small boats. The Starin was headed for Bridgeport in an effort to save her, but she missed the entrance to the breakwater and went ashore on the flats outside. It is possible that the boat will be a total loss.

Secretary of the Navy Newberry is endeavoring to have a new edition of the book entitled "Flags of Maritime Nations," printed. An edition of 5,000 would cost about \$10,000. The last was printed in 1899 and it is necessary that all vessels of the navy be supplied with a copy as well as naval stations. Other departments of the government also make official use of this list of all flags of different nations.

The keel was laid recently at the Portsmouth dock yard of the British battleship Neptune, which is to be a record breaking Dreadnought. She will have a displacement of 20,200 tons and will be 510 ft. long, or 20 ft. longer than the original Dreadnought. The Neptune is to have ten 12-in. guns, mounted in pairs in barbettes, which will have a superior range. Her cost will be £2,000,000 and she is to be completed in two years.

The Kroeschell Bros. Ice Machine Co., manufacturers of carbonic anhydride ice and refrigerating machines, Chicago, are now installing a refrigerating plant in the Hamonic building at the yard of the Collingwood Ship Building Co., Colling-

wood, Ont. This refrigerating plant has 10 tons refrigerating capacity in 24 hours and the compressor is direct-connected to a steam engine, the different rooms being cooled by the carbonic anhydride direct-expansion system.

The British steamship Spondilus, which arrived at Philadelphia in ballast from London to load oil for Calcutta, left Point Breeze for New York on Monday to finish loading. Only a small portion of her cargo was loaded at Philadelphia. The Spondilus is one of the largest bulk oil carriers that has ever visited Philadelphia, having a carrying capacity of 9,500 tons of oil and 1,600 tons of bunker coal.

Divers were recently put to work in the forward hold of the Lloyd Italiano steamship Florida, which rammed the Republic, and which is now lying at a Brooklyn wharf discharging her cargo. They found general cargo consisting of wine, straw hats, talcum powder, caraway seeds and canned olive oil. The wine and oil were in good condition but the rest was entirely ruined. There was 18 ft. of water in this hold.

Horace G. Phillips, formerly assistant treasurer of the International Mercantile Marine Co., has been elected treasurer to succeed James Fahnestock Jr., who recently resigned. Other changes occasioned by his resignation are: E. Edgar Heston, cashier, succeeds Mr. Phillips as assistant treasurer; Charles G. Fahlgren takes the post of cashier to succeed Mr. Heston. All these changes became effective Jan. 1. Mr. Phillips,

the new treasurer, entered the passenger department of the American and Red Star lines in Philadelphia in 1877. He came to New York as cashier of these lines in 1899 and was appointed assistant treasurer of the International Mercantile Marine Co., when that corporation was formed.

The new steamer which is to be built for the Matson Navigation Co., of San Francisco, Cal., is to be 450 ft. long, and will have a speed of 15 knots. There are to be 51 staterooms and on the bridge deck all staterooms will have private baths attached. The vessel is to be ready for service at the beginning of 1910.

It has been announced that the provincial government of New Brunswick is to continue for five years the subsidy of \$3,000 a year to Percy W. Thomson for maintaining a twice-a-week steamer service between St. John and Yarmouth. The new service is to take the place of the weekly sailings previously performed by the steamer Senlac between St. John and Halifax and shore ports.

Secretary of the Navy Newberry has made it plain that he does not expect to retain his portfolio when President-elect Taft begins his term of office. Secretary Newberry has already arranged to sail from New York on the Adriatic on March 31, for a long trip abroad. It is reported that he will later make a tour of the world.

It has developed in the examination of the auditor of the department of docks and ferries of the city of New York by a joint committee of the state legislature, that New York City, in 1907, lost through the operation of the Thirty-ninth street and Staten Island ferries, \$1,026,272.19. Of this amount \$303,064.10 is chargeable to the Thirty-ninth street ferry and \$723,208.09 to the Staten Island ferry.

Rear Admiral Caspar Frederick Goodrich, commandant of the New York navy yard, and since the retirement of Rear Admiral Robley D. Evans, the ranking rear admiral on the active list, retired Jan. 7. He had been in the service nearly 44 years, during which time he has held some of the most important posts in the department of the navy. Admiral Goodrich was born in Philadelphia, Jan. 7, 1847, and was appointed to the naval academy from Connecticut, entering in 1861, and being graduated as first honor man of his class in 1864. He was made a rear admiral in 1904. It is believed that Rear Admiral Goodrich will continue in the command of the navy yard until the end of President Roosevelt's administration. His successor has not as yet been appointed.

Iron Ore Shipments During 1908.

The complete returns covering the shipments of ore from the Lake Superior district during the year 1908 show that there was moved by lake and by rail 26,014,987 tons exclusive of 148,000 tons shipped from the Helen mine via Michipicoton. Of the total given 587,893 tons was shipped all-rail. All-rail shipments are chiefly from the Mesabi range to the Zenith furnace at Duluth, from the Newport and Hemlock mines to Mayville, from the Illinois and Mayville mines in Wisconsin to Chicago and Mayville and from some of the Cleveland Cliffs Iron Co's Marquette range mines to the charcoal furnaces of Michigan. The total shipment is rather larger than generally anticipated and represents the maximum predictions for the year. As compared with 1907, there was a falling off of 16,251,681 tons or a little more than one-third. The Oliver Iron Mining Co. shipped 14,123,957 tons as compared with 22,710,898 tons last year, a decrease in about the same ratio as the decrease in the total shipments, so that the proportion of production by the steel corporation shows no appreciable change from the 56 per cent of a year ago.

From the Marquette and Menominee ranges there was shipped but little more than one-half as much ore as in 1908. A better proportion was maintained from the Gogebic range. For the first time since 1894, the shipments from the Vermilion range fell below 1,000,000 tons. This was due to a general curtailment and to the abandonment of the historic Chandler mine, whose period of activity extended over 20 years yielding about 10,000,000 tons of ore. The Mesabi range, whose shipments ordinarily include several totals of more than 1,000,000

tons from individual mines, records such shipments from only three mines. The Hull-Rust, Fayal and Burt properties shipped almost up to their 1908 records and sent out 2,926,683, 1,439,879 and 1,460,998 tons respectively. How rapidly the requirements and status of the mining situation may change is well illustrated by the fact that the Mountain Iron mine which until 1907 was the largest producer, shipping 2,563,111 tons, was called upon last year for only 206,698 tons. The record in detail of the shipments for the past year is given by the accompanying figures.

The properties producing for the first time in 1908 include the Washington on the Marquette range, Kellogg, Sliver and Sweeney on the Mesabi, and on the Menominee range the Berkshire and Zimmerman. Several mines from which no ore has been taken for many years are credited with shipments for 1908, including the Mitchell on the Marquette, the Minnewas on the Mesabi, and the Gibson and Quinnesec on the Menominee range. The aggregate shipment from the new and rejuvenated properties amounted to 131,595 tons. For the first time the shipments of the Mayville mine are included in the supplement which will accompany the next issue. This mine has been operating since 1892 and has produced a total of 345,088 tons, the ore being shipped to the furnaces of the Northwestern Iron Co., by which interest the mine is owned.

Owing to the fact that the annual chart giving ore shipments in detail has been standing for many years, some typographical errors crept in and to correct these and make other revisions, the time of publication has been delayed longer than usual. The chart will ap-

pear as a supplement to the issue of March 18.

Production by Mines.

GOEBIC RANGE.		Hull	163,020
Anvil	35,937	Hull-Rust	2,926,683
Ashland	259,611	Iroquois	151,071
Atlantic	41,465	Jennings	18,313
Brotheron	96,776	Jordan	118,529
Cary (And Superior)	96,358	Kellogg	31,331
Colby	58,305	La Belle	51,638
Eureka	122,324	Larkin (Te-	
Iron Belt	2,508	sora)	14,030
Ironton	92,932	La Rue	79,313
Mikado	86,617	Laura	176,725
Montreal	177,006	Leetonia	289,490
Newport	579,390	Lincoln	379,219
Norrie Group	773,243	McKinley	1,399
Ottawa (Odanah)	33,893	Mahoning	611,592
Pike	6,303	Malta	93,072
Sunday Lake	111,130	Mariska	30,226
Tilden	111,184	Miller	224,321
Vale (West Colby)	14,874	Minnewas	525
		Minorce	80,330
		Mohawk	119,439
		Morris	528,154
Total	2,699,856	Morrow	1,571
MARQUETTE RANGE.		Mtn. Iron	206,698
American	23,222	Myers	150,249
Austin	111,229	Onandaga	30,887
Beaufort (Ohio)	61,035	Pettit	57,140
Breitung		Pillsbury	59,889
Hem. No. 2	55,849	Rust	227,079
Cambria	85,977	Sellers	354,780
Champion	313	Shenango	461,887
Cleve'd. Cliffs Group	438,379	Sliver	49,291
Empire	53,537	Spring	20,516
Hartford	278,366	Spruce	430,633
Imperial	48,231	Stevenson	516,770
Lake Ange-line	220,410	Susquehanna	182,352
Lake Superior	261,955	Sweeney	7,579
Lillie	8,632	Tener	174,033
Lucey (Mc-Cumber)	1,115	Troy	40,283
Maas	29,036	Union	20,937
Mary Char-lotte	99,104	Utica	57,194
Mitchell	11,539	Victoria	21,310
Negaune	232,219	Virginia (Oli-ver)	661,329
Princeton (Swanzy)	36,033	Webb	19,610
Queen (Blue Republic)	104,098	Winnifred	
Richmond	67,999	(Day)	61,341
Rolling Mill	60,994	Yates	86,308
Stephenson	52,147	Yawkey	84,446
Washington	52,588	Total	17,257,350
	20,625	MENOMINEE RANGE.	
Total	2,414,632	Aragon	226,354
VERMILLION RANGE.	50,639	Baltic	129,037
Chandler	472,506	Berkshire	3,340
Pioneer	82,521	Bristol	190,300
Savoy	127,544	Calumet	15,222
Sibley	53,070	Caspian	102,628
Soudan (Min-nesota)	50,264	Chapin	391,620
Zenith		Chatham	45,826
Total	841,544	Crystal Fall	296
MESABI RANGE.		Dohen (River-ton)	47,073
Adams	765,592	Dunn	8,829
Adriatic	108,129	Florence	140,354
Agnew	164,486	Fogarty	32,566
Albany	64,860	Gibson	4,548
Alberta	51,143	Great West-ern	124,246
Alexander	35,747	Groveland	9,123
Bessemier	120,350	Hemlock	83,834
Biwabik	365,781	Hiawatha	138,190
Brunt	636	Hollister	10,671
Burt	1,460,998	James	59,760
Canisteo	2,760	Loretto	13,354
Chisholm	228,386	Mansfield	44,633
Cincinnati	4,790	Michigan	603
Clark	334,594	Millie (Hew-itt)	3,322
Commodore	116,069	Munro	27,773
Corsica	77,674	Nanaimo	305
Crosby	152,084	Penn Iron	
Croxton	154,868	Mining Co.	176,211
Cyrus	115,745	Pewabic	365,341
Duluth	149,185	Quinnesc	1,410
Elba	147,916	Saginaw (Per-kins)	38,669
Fayal	1,439,879	Tobin	161,642
Forest	2,420	Vivian	10,056
Fowler	21,511	Youngs	70,094
Franklin	8,246	Zimmerman	1,832
Gilbert	336,927	Total	2,679,156
Glen	272,142	Grand Total	26,014,987
Hartley	55,462	MISCELLANEOUS.	
Hawkins	248,246	(In Wisconsin.)	
Holman	1,682	Total	122,449

SHIPMENTS BY RANGES, GROSS TONS.

	1908	1907	1906	1905	1904	1903
Marquette Range	2,414,632	4,388,073	4,057,187	4,215,572	2,843,703	3,040,245
Menominee Range	2,679,156	4,964,728	5,109,088	4,495,451	3,074,848	3,749,567
Gogebic Range	2,699,856	3,637,102	3,643,514	3,705,207	2,398,287	2,912,708
Vermilion Range	841,544	1,685,267	1,792,355	1,677,186	1,282,513	1,676,699
Mesabi Range	17,257,350	27,495,708	23,819,029	20,158,699	12,156,008	12,892,542
Miscellaneous	122,449	95,790	144,589	132,001	94,042	36,749
Total	26,014,987	42,266,668	38,565,762	34,384,116	21,849,401	24,308,510

SHIPMENTS BY PORTS AND ALL-RAIL, GROSS TONS.

	1908	1907	1906	1905	1904	1903
Escanaba	3,351,502	5,761,988	5,851,050	5,307,938	3,644,267	4,277,561
Marquette	1,487,487	3,013,826	2,791,033	2,977,828	1,907,301	2,007,346
Ashland	2,513,670	3,436,867	3,388,106	3,485,344	2,288,400	2,822,915
Two Harbors	5,702,237	8,188,906	8,180,125	7,779,850	4,566,542	5,120,656
Gladstone					553	35,816
Superior	3,564,030	7,440,386	6,083,057	5,118,385	4,169,990	3,978,579
Duluth	8,808,168	13,448,736	11,220,218	8,807,559	4,649,611	5,356,473
Total by lake	25,427,094	41,288,755	37,513,589	33,476,904	21,226,664	23,649,550
Total by rail	587,893	975,959	1,052,173	907,212	622,737	659,164
Total	26,014,987	42,266,668	38,565,762	34,384,116	21,849,401	24,308,510



DEVOTED TO EVERYTHING AND EVERY
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March 11, 1909.

THE OPEN SHOP POLICY.

The present week in lake circles has been one of great interest. As is well known, the Lake Carriers' Association declared for the open shop policy on board its vessels hereafter, guaranteeing the high st of wages and the best of working conditions. No trouble has been experienced in the forward end of the ship nor is any looked forward to; but the Marine Engineers' Beneficial Association objects to its members entering into contract with the vessel owners upon the new basis, though it does not object to them performing the work. The Lake Carriers' Association, however, is committed irrevocably to the open shop policy. Two of the fleets enrolled in the association, the Pittsburg Steamship Co. and Pickands, Mather & Co., met with their engineers this week, an account of which will be found elsewhere in this issue.

The address of Harry Coulby, president and general manager of the

Pittsburg Steamship Co., was the leading feature of these meetings. That address is commended to everyone. It should be read by everyone employed aboard ship on the lakes. It should be read with especial attention by every engineer. Let him then leave to his own conscience the question as to whether there is anything objectionable or unfair about it. It is one of the fairest, broadest and most enlightened statements ever submitted by an employer to his men. It is permeated throughout with a disposition to be fair. That it should also be firm is inseparable from its spirit of fairness. No man can be fair unless he has the firmness to defend and maintain fair conditions.

Mr. Coulby's statement marks an important step in the history of the lakes. It is an epitome of the great efforts that have been made on the great lakes during the past few years to bring cohesion into the business and to make the interests of capital and labor a common one. There can be no real success unless both work in unison.

CONGRESSIONAL ACTS AFFECTING SHIPPING.

As far as the first session of the sixty-first congress is concerned it passed only four measures affecting shipping. The first was the steerage accommodation bill, increasing accommodations of and adding to the comfort of steerage passengers. The second was a bill deducting from the gross tonnage of vessels hatchway spaces and water ballast spaces. The purpose of this bill is to bring the law of the United States in substantial accord with the laws of Great Britain, Germany and other maritime countries.

The third bill was an amendment to Section 4434 of the Revised Statutes relating to boiler construction. This embodies an agreement on desirable changes made by the Board of Supervising Inspectors of Steam Vessels and the boilermakers of the United States.

The fourth bill appropriated \$5,000 for the representation of the United States at the Brussels conference

which will meet probably in September or October for preparation of international treaties or conventions on subjects specified in the bill.

The steerage accommodation bill reads as follows:

That section one of the passenger Act of 1882 be, and is hereby, amended so as to read:

"It shall not be lawful for the master of any vessel wherein steerage passengers have been taken at any port or place in a foreign country or dominion (ports and places in foreign territory contiguous to the United States excepted) to bring such vessel and passengers to or take from any port or place in the United States unless the compartments, spaces, and accommodations herein-after mentioned have been provided, allotted, maintained, and used for and by such passengers during the entire voyage, unobstructed by cargo, stores, or goods. The master of a vessel coming to a port or place in the United States in violation of any of the provisions of this section shall be deemed guilty of a misdemeanor; and if the number of steerage passengers carried or brought in the vessel, or in any compartment, space, poop, or deck house thereof, is greater than the number allowed to be carried or brought therein, respectively, as hereinafter prescribed, the said master shall be fined fifty dollars for each and every such passenger in excess of the proper number, and may also be imprisoned, not exceeding six months.

"In computing the number of passengers carried or brought in any vessel, children under one year of age shall not be included, and two children between one and eight years of age shall be counted as one passenger; and any person brought in such vessel who shall have been, during the voyage, taken from any other vessel wrecked or in distress on the high seas, or have been picked up at sea from any boat, raft, or otherwise, shall not be included in such computation.

"Second. The expression 'steerage passenger' means all passengers except cabin passengers, and persons shall not be deemed cabin passengers unless the space allotted to their exclusive use is in the proportion of at least thirty-six clear superficial feet to each passenger.

"Third. The expression 'lowest passenger deck' means the deck next below the water line; and the expression 'passenger deck' includes every deck or portion of a deck which is above the lowest passenger deck, and is appropriated for passengers.

"Fourth. A vessel shall not carry passengers, whether cabin or steerage passengers, on more than one deck below the water line.

"Fifth. The height between that part of any deck on which steerage passengers are carried and the deck immediately above it shall not be less than six feet.

"Sixth. No steerage passenger shall be carried on the lowest passenger deck unless it is efficiently lighted by side scuttles and otherwise to the satisfaction of the inspector.

"Seventh. No greater number of steerage passengers shall be carried on the lowest passenger deck than in the proportion of one steerage passenger to every twenty-one clear superficial feet allotted to their use. If, however, the height between the lowest passenger deck and the deck immediately above it is less than seven feet, and the apertures exclusive of side scuttles, through which light and air are admitted are less in size than in the proportion of three square feet to every one hundred superficial feet of that deck, no greater number of steerage passengers shall be carried on that deck than in the proportion of one steerage passenger to every thirty clear superficial feet thereof subject to the allowance for measurement of public rooms, lavatories, and bathrooms, if any, provided for by paragraph ten.

"Eighth. No greater number of steerage passengers may be carried on a passenger deck than in the proportion of one steerage passenger to every eighteen clear superficial feet of deck allotted to their use, subject to the allowance for measurement of public rooms, lavatories, and bathrooms, if any, provided for by paragraph ten. If, however, the height between any passenger deck and the deck immediately above it be less than seven feet, no greater number of steerage passengers may be carried on that deck than in the proportion of one steerage passenger to every twenty-one clear superficial feet thereof, subject to the allowance for measure-

ment of public rooms, lavatories, and bathrooms, if any, provided for by paragraph ten.

"Ninth. A vessel, whatever be the superficial space of the passenger decks and of the lowest passenger deck, shall not carry a greater number of steerage passengers on the whole than in the proportion of one steerage passenger to every five superficial feet of air or promenade space provided on a deck so open as not to be included in the tonnage and approved by the inspector, and this space shall not be counted or included in the area available for any other passengers, or in other areas for steerage passengers prescribed by this section.

"Tenth. In the measurement of the passenger decks and of the lowest passenger deck, the space occupied by that part of the personal baggage of the steerage passengers which the inspector permits to be carried there shall be included, and also on whatever deck located commodious and suitable dining rooms, lounging rooms, smoking rooms, lavatories, toilet rooms, and bathrooms: *Provided*, That—

"(a) The space in any place appropriated to the use of steerage passengers in which they sleep shall not be less than eighteen superficial feet in the case of the lowest passenger deck and fifteen superficial feet in the case of a passenger deck.

"(b) Each space so included in the measurement must be clearly marked to the satisfaction of the inspector as being exclusively appropriated for the use of the steerage passengers.

"Eleventh. Each separate compartment in which steerage passengers are berthed shall be conspicuously marked, showing the total area of such compartments."

Sec. 2. That section forty-two and so much of sections forty-three and forty-four of the Act approved February twentieth, nineteen hundred and seven, entitled "An Act to regulate the immigration of aliens into the United States," as provides for the repeal of section one of the passenger Act of eighteen hundred and eighty-two are hereby repealed.

Sec. 3. That this Act shall take effect on January first, nineteen hundred and nine.

The bill deducting hatchways and water ballast spaces reads as follows:

That section one of the Act approved March second, eighteen hundred and ninety-five, entitled "An Act to amend section one of chapter three hundred and ninety-eight of the laws of eighteen hundred and eighty-two, entitled 'An Act to provide for deductions from the gross tonnage of vessels of the United States,'" is hereby amended by inserting after paragraph (h) the following words:

"The cubical contents of the hatchways shall be obtained by multiplying the length and breadth together and the product by the mean depth taken from the top of beam to the under side of the hatch. From the aggregate tonnage one-half of the hatchways there shall be deducted one-half of one per cent of the gross tonnage; and the remainder only shall be added to the gross tonnage of the ship exclusive of the tonnage of the hatchways."

Sec. 2. That said section is further amended by inserting at the end of the fourth paragraph after paragraph (i) the following words:

"From the gross tonnage there shall be deducted any other space adapted only for water ballast certified by the collector not to be available for the carriage of cargo, stores, supplies, or fuel."

The bill relating to boiler construction makes the following changes:

That section 4434 Revised Statutes of the United States, as amended by the Act of Congress, approved February 28, 1893, be amended by inserting a hyphen and the word "eighth" after the word "thirty" in the second line of the section, and by inserting after the word "diameter" in the ninth line of the section a comma and the words "the measurements to be taken from the center of the length of the tapered section of said flues" and by striking out, in the fifteenth and sixteenth lines of the section, the words "Secretary of the Treasury" and inserting in their place the words "Supervising Inspector-General" and by inserting after the word "thirty" in the twentieth line of the section, a hyphen and the word "eighth," and after the word "the" in the twenty-third line of the section, the word "approved," so that the section as amended shall read as follows:

Sec. 4434. No externally fired boiler having its shell constructed of iron or steel

plates, exceeding an average thickness of thirty-eight one-hundredths of an inch, shall be employed on any steam vessel navigating the Red River of the North or rivers flowing into the Gulf of Mexico or their tributaries; and no externally fired boiler employed on any such steam vessel shall have less than three inches space between its shell and any of its internal flues, and not less than three inches space between such flues when any such flues are more than five inches in diameter, the measurements to be taken from the center of the length of the tapered section of said flues; and every such externally fired boiler employed on any such steam vessel shall be provided with a manhole in the lower part of the front head thereof, of such dimensions as may be prescribed by the Board of Supervising Inspectors, in all cases where the distance between its internal flues is less than three inches. Externally fired boilers having shells constructed of iron or steel plates not exceeding an average thickness of fifty one-hundredths of an inch may, in the discretion of the Supervising Inspector-General, be authorized and employed on steam vessels navigating the Atlantic and Pacific oceans, or saltwater bays, or sounds, or the Great Lakes, or any of them, and waters flowing to and from the same, or any of them: *Provided*, That on inspection, no plate that is by this Act limited to a thickness of thirty-eight one-hundredths of an inch and no plate that is by this Act limited to a thickness of fifty one-hundredths of an inch shall be rejected for use if found to exceed those dimensions, respectively, if the approved average thickness thereof does not exceed the limits therein specified, and the amount of steam pressure that will be permitted to be carried in boilers constructed in accordance with the requirements of this Act shall be determined from measurements showing the least thickness of the plates.

Sec. 2. That all externally fired boilers, constructed of iron or steel, prior to the passage of this Act, and now in use on any such vessels, wherein the space between the shell and any of its internal flues or between such flues is less than three inches, they shall be deemed lawfully constructed.

Sec. 3. That all laws or parts of laws conflicting with this Act are hereby repealed.

The bill on the international conference on maritime law is as follows:

International Conference on Maritime Law: For expenses necessary for the representation of the United States at the Third International Conference on Maritime Law to be held at Brussels, Belgium, for the purpose of considering draft conventions relating to collisions, salvage, the liability of shipowners and cognate subjects, \$5,000, or so much thereof as may be necessary.

PIG IRON SITUATION.

Better sentiment prevails in the iron and steel trade, especially in structural material. In this latter material considerable new business has developed. The recently announced new prices are being firmly maintained. Wage reductions among rolling mills and blast furnace employees have become general in eastern Pennsylvania, but in other sections, a disposition is manifested to await tariff developments. An independent ore interest not affiliated with those which usually act in harmony has sold 250,000 tons of ore in addition to a block of 50,000 tons announced some time ago. Extreme quiet prevails in pig iron in nearly all sections, especially in the east and south. Buyers in the Chicago market have been able to do better than \$23 Pittsburg on billets, the prevailing quotation. Old prices on wire products prevail, and the former price for tin plate is being maintained. The

sheet business has improved, and the outlook for tubes and steel pipe is very encouraging.

FEBRUARY LAKE LEVELS.

The United States lake survey reports the stages of the great lakes for the month of February, as follows:

Lakes.	Ft. above tide-water, New York.
Superior	601.48
Michigan-Huron	579.94
Erie	571.40
Ontario	245.28

Since last month, Lake Superior has fallen $2\frac{3}{4}$ in., Lakes Michigan and Huron have risen $\frac{3}{4}$ in., Lake Erie has fallen 1 in., and Lake Ontario has risen $1\frac{1}{4}$ in.

During March Lake Superior is likely to fall $1\frac{1}{2}$ in.; Lakes Michigan and Huron should rise $1\frac{1}{2}$ in., Lake Erie should rise $2\frac{1}{2}$ in., and Lake Ontario should rise $2\frac{1}{4}$ in.

Lake Superior is $8\frac{1}{4}$ in. lower than the average February stage of the past ten years and about $4\frac{1}{2}$ in. lower than last year. It is $5\frac{3}{4}$ in. higher than in February, 1893, but $11\frac{1}{2}$ in. lower than in 1906, and 12 in. lower than in 1901.

Lakes Michigan and Huron show a stage $1\frac{3}{4}$ in. lower than the average February stage of the past ten years and $6\frac{3}{4}$ in. lower than last year, but $9\frac{1}{4}$ in. higher than in 1896. In February, 1886, the water was $33\frac{3}{4}$ in. higher.

Lake Erie is $9\frac{1}{2}$ in. lower than in February last year and 2 in. below the mean February stage of the past ten years, but is $6\frac{1}{4}$ in. higher than in 1896. It is $18\frac{1}{4}$ in. lower than in February, 1878, and $19\frac{3}{4}$ in. lower than in 1887.

Lake Ontario is $20\frac{1}{2}$ in. lower than in February last year and $1\frac{1}{4}$ in. lower than the average February stage of the past ten years. In 1870 it was $25\frac{1}{2}$ in. higher, and in 1886 $28\frac{3}{4}$ in. higher than in 1909. In February, 1897, it was $17\frac{1}{2}$ in. lower.

GROWTH OF AVERAGE CAR-GOES.

Figures of the Duluth, Missabe & Northern road for the past 14 years show the increase in annual average cargoes loaded there to have been as follows:

1895.....	1,809	1902.....	4,814
1896.....	2,214	1903.....	5,668
1897.....	3,541	1904.....	5,670
1898.....	3,550	1905.....	6,037
1899.....	3,903	1906.....	6,973
1900.....	3,783	1907.....	7,516
1901.....	4,459	1908.....	8,325

The index for volume 38 of the MARINE REVIEW is now ready and will be mailed to any subscriber upon request.

Mr. Coulby and His Engineers.

The officers of the Pittsburg Steamship Co. and Pickands, Mather & Co. met with their engineers in the rooms of the Ship Masters' Association, Cleveland, this week. Mr. Harry Coulby, president and general manager of the Pittsburg Steamship Co., addressed them. About 150 chief engineers and second engineers were present. Before calling the meeting to order Mr. Coulby announced that if any engineers present regretted having signed contracts for any reason whatever, they were privileged to return them, and that no ill feeling whatever would be engendered thereby. He explained that his company had never used coercion in employing men and never would; that they should feel free to secure berths wherever they chose and that as far as the fleets managed by him were concerned, they did not want to employ men unless they felt that they would be loyal to the company.

"If any of the engineers present," continued he, "feel that they made a mistake in signing contracts with me they may return them and leave immediately. Their action will not be held against them, but will be instantly forgotten. If, on the other hand, any present retain their contracts and remain in this meeting in the interest of others and then repudiate their contract, they may never again expect employment in any company with which I am connected."

As soon as Mr. Coulby had concluded these preliminary remarks, Chief Engineers W. P. Diamond, M. F. Sweeney and Assistant Engineers A. E. Southgate, Edward Ducharme and Alfred Goodwin walked up to the desk in a body, laid down their contracts and left the room. The officers of the steamship companies were inclined to believe that the action was premeditated and intended to stampede the meeting. In this respect it signally failed, though the Marine Engineers' Beneficial Association claims that there was no such intention.

President Yates, vice-president Tindall and a number of members of the Marine Engineers' Beneficial Association were in Cleveland in the interests of their association. At the conclusion of the meeting President Yates wired to all the lake lodges that the Marine Engineers' Beneficial Association was stronger than ever before.

The engineers listened with close attention to Mr. Coulby's address, the



MR. HARRY COULBY, PRESIDENT AND GENERAL MANAGER PITTSBURGH STEAMSHIP CO.

delivery of which took up the greater part of the morning. Mr. Coulby said:

To Our Chief Engineers:

In calling you together in convention I believe I am carrying out the often expressed wish of many of you to return to the system adopted a number of years ago when I had charge of the Pickands, Mather & Co. fleet, of having yearly meetings attended by the chief engineers of our fleet and the management to talk over matters of general interest in our operation. I have always believed that these meetings were productive of great good to both the employer and the employee, and hereafter I intend to have these meetings every spring. It gives us an opportunity of getting acquainted with each other, and we shall always be pleased to have suggestions from any of you looking towards improving the service.

The magnitude of our lake transportation, the ease and facility with which we move such a tremendous tonnage each year, is one of the wonders of the transportation world, and a large measure of the credit is due to the men who are handling our ships.

When a Steamer Breaks Her Record.

We very frequently see in the public press a statement that some steamer has broken her record for speed; that some ship long overdue has finally limped into port with her rudder gone, or that her shaft broke in midocean, and, after temporary repairs were made, she worked her way into port under greatly reduced speed. The unthinking public are very likely to give all the credit to the captain. Without detracting from the bravery and skill of the captain and his navigating officers upon whom rests the responsibility of avoiding the unseen dangers of the sea, and upon whose vigilance and discipline rests the lives entrusted to their care, you and I, who have to do with ships, know that when any speed record is broken, when any ship travels 50 or 100 miles more in 24 hours than she ever did before, the credit is largely due to the boys in the engine room. It is not the officers on the bridge that makes her go, but it is the chief engineer and his corps of assistants who are watching every bearing and every bit of machinery, getting every revolution possible out of the engine, faithfully and loyally aided by the boys in the fire hold,

who, stripped to the waist and covered with soot, are feeding the furnaces, with an eye constantly on the gages to see that the steam pressure is maintained. The same is true in breakdowns. The engineers are the men chiefly relied upon to make the temporary repairs to enable the ship to reach port; and when I go over our season's record of operation and note how small has been the delay to our ships on account of machinery, I am impressed with the skill, efficiency and attention to duty displayed by the men on the after end.

Our Form of Appointments.

I now want to say a few words with reference to our form of appointment, or, as it is more commonly called, "The Engineers' Contract." The statement has been made that it is objectionable to some engineers "inasmuch as it required them to discriminate against other employees of the steamer," and also that "it required them to work with inexperienced and incompetent men in their department," and that "those who have signed it had decided to cringe and crawl to their employers." Let us read the so-called "Objectionable Clause" and see what it does say. It is as follows:

"As we have decided upon the policy of Open Shop, you will be expected to, and by your acceptance hereof will agree to, fully co-operate in this policy, and in keeping off from the ship any representatives of interests other than the ship and owner so far as your department is concerned; and also to work with any employee of this company regardless of union or other affiliations."

Is there anything there requiring you to discriminate against any other employee of the ship, or that requires you to work with inexperienced and incompetent men? There is not one word about discriminating against any employee of the ship. On the other hand, it expressly prohibits you from discriminating against any employee because of union or other affiliations. Why should we ask you to work with inexperienced and incompetent men? We are paying the highest scale of wages ever paid for like service. If we had two scales of wages for the same work, one for experienced and competent men, and a lower scale for inexperienced and incompetent men, there might be some force to the argument. You know our system of employing men. You select your assistant engineers, who must be approved by our chief engineer, and upon you rests the responsibility of

hiring your other subordinates subject to the general rules of the company. I assume there is no man in this room who will question the right of the management to insist upon you, as the head of our department, keeping off from the ship any representatives of other interests than the ship and owners, so far as your department is concerned, any more than you would question my authority to insist upon the heads of departments in our general office to keep out of the office book-agents, solicitors and peddlers. This leaves nothing to the "Objectionable Clause" but the "Open Shop" policy, and I guess after all that is the "Nigger in The Wood-Pile." Now, gentlemen, that clause means just what it says, and says just what it means, leaving nothing to read between the lines. You all know how unbearable conditions became on board our ships both to you and every other officer prior to 1908.

Three years ago when working under the Closed Shop you almost begged me not to turn over to a few irresponsible delegates the authority to determine who should, and who should not, be your subordinates, claiming it was not conducive to good discipline. The officers on the forward end of the ship made the same request, and, in fact, the same statements were made by officers of ships to every manager and owner on the Great Lakes. A year ago the Lake Carriers' Association decided to return to the "Open Shop" policy, and at about the same time you men requested I should go back to our old method of individual written appointment, which I did. Last fall you asked us to sign up your assistants under a similar form, which was also done, all of which I firmly believe is a step in the right direction—towards drawing us closer together and making a more compact, loyal organization.

Open Shop to Stay.

So far as this company is concerned, we shall not recede from the position we have taken, and no licensed officer will be employed by us who does not subscribe to the "Open Shop" policy when requested to do so, and stands ready to show his appointment to the management at any time as an evidence of good faith. The statement has been made that if this policy is allowed to obtain you will quickly find yourselves working for a like wage and similar conditions to those existing 10 or 15 years ago. The answer to this statement is: You all remember the little unpleasantness with the captains five years ago and

with the mates three years ago, and the awful things prophesied would happen if they did not get what they thought they wanted. I venture the statement that the great majority of our captains and mates are better satisfied with conditions as they are today in this employ, and I know there is no more loyal and efficient body of men sailing on salt or fresh water than these same captains and mates.

Then again, the statement has been made that what we require is unlawful. I shall dismiss this by saying that we not only do not desire, but positively forbid, any violation of the laws by any of our employes.

Lake Carriers' Welfare Plan.

You have been furnished with a copy of the pamphlet dealing with the Lake Carriers' Bureau of Registration and Welfare Plan for the benefit of employees of vessels. I hope you will study this over very carefully, as it is my desire that all our employes should be enrolled on its books. After the Lake Carriers' Association decided to return to the "Open Shop" principle some of its most influential members felt that some plan should be devised for a closer relation between officers and men and owners of vessels, and that all the employes on ships should have some avenue of reaching the executive committee of the Lake Carriers' Association with any complaints of violation of the declared principles of the association. A committee was appointed who did much good work and who gave much earnest thought to this subject, the result of which is stated in the pamphlet I have referred to, and which has been approved and adopted by the association. I have noticed that it has drawn out considerable comment and criticism, which naturally was to be expected, and which shows that it is receiving a good deal of consideration.

Briefly, the plan provides for assembly rooms in such principal ports on the lakes as the executive committee from time to time decide. These rooms shall be assembly rooms for the sailors, furnished with newspapers and magazines, places for writing letters, etc., the charge for which shall be one dollar a year to seamen who will be furnished with a certificate from the association. Officers of ships will also be furnished with certificates with a somewhat larger charge. With this certificate will also be furnished a record discharge book, except as to masters and chief engineers, bearing the same number as the certificate, which will be put in the hands of

the holder to be deposited by him, at the time of signing articles, with the master or chief engineer, according to the department of service. In this book such executive officers will, at the termination of the service on the ship, enter a discharge, and, in the appropriate column, a statement of the character of service. If this entry be "Good" or "Fair" the book shall be returned direct to the man, but when, in the best judgment of the officer with whom the book has been deposited, such entry cannot be justly made, and in case of desertion after having shipped, or failure to serve after engaging, the book shall be returned by the master to the secretary of the association together with a statement of explanation from the officer with whom the book was deposited. The association will thereupon take such action and in such manner as it may deem wise and just as to whether or not it will cancel its outstanding certificate.

Payment of Death Benefits.

There is also a plan for the payment of death benefits in case of accidental death while in the employ, without reference to or having any bearing or effect whatsoever or legal claim or liability concerning same. A special committee has been appointed by the Lake Carriers' Association who have direct charge of this work, and to whom every bearer of a certificate will have the right to appeal in cases where he feels he has been unjustly treated. Briefly every man following the lakes for a livelihood and has registered, who faithfully performs his duties, will have the full protection of the Lake Carriers' Association against any unjust or unfair treatment on the part of officer or owner.

Statements have been prepared of the operating costs in your department during the past year, copies of which will be furnished you and which our people will discuss with you, and I shall be disappointed if we do not show a decided improvement in some respects during the coming season.

As you are all aware, the policy of this company is to promote men from its own ranks as opportunity offers and the men have proved their fitness. As vacancies occur in the ranks of our captains we fill them by promotions from our chief officers, and we shall now adopt the same plan with reference to our engineers. As vacancies occur in the ranks of our chief engineers they will be

filled by promotion of the second engineers, and I want this plan of promotion applied all down the line, to the lookoutmen and wheelmen at the forward end of the boat, and the firemen and oilers at the after end.

The best results in the operation of any business are obtained from having loyal employees who are looking to the company for promotion, and I hope it will not be necessary for us to go outside of our own line in case there is a vacancy above the position of fireman in your department.

Change in Method of Payment.

During the coming season there will be some change in the method of paying our men. All licensed officers on the ships will be paid monthly by check from the general office. My reason for doing this is because I feel when they have attained the position of an officer they become part of our executive force, and I desire that our office record of their service should be complete, and that they should not be discharged from the service without good and satisfactory reasons have been furnished.

In shipping your crews I desire you to make as careful selection as possible to get good men. Try and secure the services of men who desire to work for the company under our rules and who will look to us for promotion. You will not be permitted to employ any relations of yourself or your subordinates. The fleet is large, and if you have any relations who desire to work for the company, you ought to be able to place them with your associates, but I do not believe it is conducive to good discipline to allow your officers to employ their relations on their ships.

To protect the men in our employ against any unjust or unfair treatment, I desire to safeguard them even beyond the provisions of the registration bureau of the Lake Carriers' Association. No chief engineer in the employ will be discharged until after the case has been personally investigated by me. As the chief engineers of our steamers are responsible for their department, they will have the authority to discharge any of their subordinates, on the distinct understanding, however, that the men have a right to appeal their case to the general office. The motto of this company with reference to its employees shall be the same as that adopted by the Lake Carriers' Association—*Liberal, appropriate wages and conditions, requiring in response loyalty, diligence and prompt service.*

Therefore, in choosing your subordinates, keep this declared principle ever before you, and in case you discharge any of your subordinates and you are asked to come to the general office to explain why you did so, be sure that you have extended to them before discharging them the same consideration as you would expect to receive yourself.

We are all co-workers in a great enterprise, interdependent upon each other. The management is powerless to get good results without the hearty and loyal co-operation of the workers, and as an inspiration to give this kind of service, I want every employee of this company to feel he is sure of a job with us, so long as he desires to follow the lakes for a livelihood, provided he renders satisfactory service, and that he will be promoted as opportunity offers and has proved his fitness.

In the case of the chief engineers of our ships, I want you to feel that, as executive officers, at the head of a most important department, you are closely identified and responsible with the captain for the successful operation. As you are aware, we distribute a bonus amongst the most successful of the captains of our first class ships, and it is my desire to adopt some similar policy with reference to the chief engineers of our first class steamers. As a start in this direction the chief engineers of our first class ships will be placed on the pay-roll this year commencing March 1 and receive their first check April 1. Without some unforeseen conditions arise necessitating the putting of our ships out of commission before the close of navigation, if their services have been satisfactory, they will receive their checks each month up to and including Jan. 1. All other employees in the engineers' department will be paid for the actual time they serve, and any vacancies occurring in the ranks of our chief engineers of our first class ships will be filled by promotion from chief engineers of our second class ships.

The Second Day's Session.

At the second day's session between Mr. Coulby and his engineers the appointments for all first-class steamers were announced and are published below. These men will go to their boats on Monday next and be paid from March 1 to Jan. 1. As to when they will start out, however, is still an indeterminate question. The outlook for immediate business is not very promising. The small steamers

of the fleet will in all probability not be started until some time after the large carriers are placed in commission, though it is expected that fitting out operations will be begun on all of them by the end of the present month.

At the afternoon meeting the welfare plan of the Lake Carriers' Association was gone over again by Mr. Coulby. The association is gratified with the reception that the welfare plan is receiving from the engineers, applications for membership being numerous. The meeting with the engineers was concluded with a dinner at the American House on Tuesday evening, all of the officials of the company being present, as well as President William Livingstone and vice president J. H. Sheadle of the Lake Carriers' Association. Mr. Coulby acted as toastmaster and addresses were made by Harvey D. Goulder, A. F. Harvey, Capt. D. Sullivan and Capt. F. B. Smith. A. F. Smith, chief engineer of the Rogers, spoke on behalf of the engineers, expressing his pleasure at the good feeling and spirit of mutual helpfulness that prevailed between the Pittsburgh Steamship Co. and its engineers.

Mr. Harvey D. Goulder's Speech.

Mr. Goulder's speech was especially notable, saying:

"We have too many ships, too much tonnage for the current business and we are all apt to look on the dark side. How can we help it? Consider last season, with bonds on many ships, insurance rates so high as to be nearly prohibitory and promise earlier in the winter of even further increase.

"We hoped it would not last so long and that we would have resumed our wonted prosperity in this country by now, but if hope long deferred maketh the heart sick—so it is always darkest before dawn.

"Let us look at the situation squarely and see the prospects of our business: We have been and are in this country of ours going through a process of evolution in business in every grade and phase of it. But with prosperity hustling us along and working everything into a great rush of business, the country did not consider enough, but simply went with it joyously until the inevitable dullness, and then, because its effects ramify every line of effort, foremost comes the question of tariff. This has been taken up now with vigor characteristic of the American people. The extra session of congress convenes within a week. The presi-

dent has urged that its work be confined to this one endeavor and preparation has been going on for months. Every promise is that the vexed and vexing question will be settled, if not in a perfect way, still so wisely, patriotically and safely through the rubbing together of the best minds of the country under the advice of a great brained, great hearted patriot in the presidential chair, that we not only hope, but feel sure that prosperity will come as it did after 1896 and with advantage of a broadened business spirit abide with us even longer.

"In the evolution has come a wonderful welding of interests, older methods are changing with modern conditions. History repeats itself, indeed, but the problems are bigger and more intricate. Railroads, the telegraph, telephone, wireless telegraphy, innumerable other inventions and their improvements and multiplied use bring us in closer touch throughout.

"It is coming to be recognized and accepted that every form of business shall be called upon to bear its just expenses, including liberal wages and conditions to everyone, as representing the cost of what that business has to sell or provide. More and more this will come to be recognized as a canon of business. So while everybody realizes that the freight rate has been cut too low, and nobody can ever expect to see rates soar to unreasonable and speculative heights, yet at rates normally based, as I am confident they will be, we then furnish the cheapest transportation in the world, of such magnitude that it is safe to say that every man, woman and child in the United States feels its good results and influence, saving, indeed, as against the next cheapest method, in every season of navigation nearly as much as the total sum spent by the government since the beginning in river and harbor improvements on the lakes.

"For this country, not exhausted, but its surface only scratched as yet, with wonderful resources, the expertness of its people in every avocation of life, hope but reflects the cool, careful and most expert business judgment that every element is ready to go forward to a more generous prosperity, not all at once, but steadily on and on.

"God speed the wisdom of the congress, for the signal to begin the general revival, which shall in due time bring up our own carrying trade, will be when William H. Taft, with purpose high as his hope, signs any well conceived tariff act, and turns a radiant face to the American people."

The gathering was in fact all that the company could desire, and the engineers left for their homes thoroughly convinced of the company's absolute fairness towards them.

Appointment of Chief Engineers.

The appointments of chief engineers for the first class steamers for the fleets of the Pittsburg Steamship Co. and Pickands, Mather & Co. are as follows:

Pittsburg Steamship Co.	
Steamer.	Chief Engineer.
Baker.....	E. S. Stoddard.
Builington.....	John Dupont.
Bessemer.....	A. G. Haag.
Black.....	Richard Mastin.
Bunsen.....	John F. Walsh.
Cole.....	H. T. McLeod.
Coralia.....	M. B. Sturtevant.
Corey.....	M. Toner.
Cornell.....	S. D. Graham.
Crescent City.....	A. E. Buddemeyer.
Dinkey.....	Geo. F. Lynn.
Eads.....	Wm. Dornbrook.
Edenborn.....	Geo. H. Barth.
Ellwood.....	Levi Walder.
Empire City.....	C. L. Birstrand.
Ericsson.....	Wm. Bourlier.
Fairbairn.....	Thos. Treleaven.
Frick.....	S. W. Armstrong.
Fulton.....	Wm. Densmore.
Gary.....	Herman Dupont.
Gates.....	H. E. McIntosh.
Harvard.....	John H. Riggan.
Hill.....	L. L. Hincline.
Houghton.....	Alex. McKenzie.
Linn.....	L. O. Willix.
Lynch.....	A. L. Eggert.
Mcdougall.....	H. F. Schroeder.
Mahietoa.....	C. E. Lawrence.
Maricopa.....	J. H. McGinn.
Mataafa.....	Geo. R. Emery.
Maunaloa.....	O. G. W. Coder.
Morgan.....	J. W. Greiner.
Morse.....	C. A. Fletcher.
Murphy.....	Geo. Arnold.
Perkins.....	E. W. Fox.
Phipps.....	E. H. Learned.
Poe.....	Fred Warning.
Princeton.....	A. Jackson.
Queen City.....	W. A. Marshall.
Ream.....	Frank Mansfield.
Rensselaer.....	F. J. Spencer.
Rockefeller.....	A. D. Birdsall.
Rogers.....	F. A. Smith.
Shaw.....	J. R. McRae.
Siemens.....	H. Edmondson.
Stephenson.....	J. W. McEachren.
Superior City.....	Harry B. Moore.
Van Hise.....	John Skelly.
Watt.....	A. J. Arison.
Widener.....	A. W. Arison.
Zenith City.....	A. L. Roberts.
Pickands, Mather & Co.	
Steamer.	Engineer.
Amasa Stone.....	C. A. Heisner.
Samuel Mather.....	Edgar Arnold.
J. C. Morse.....	A. A. Mainon.
D. O. Mills.....	H. A. Woods.
Verona.....	G. A. Butler.
Crete.....	F. A. Steadley.
Odanah.....	J. A. Southgate.
Hemlock.....	P. J. Caniff.
Calumet.....	G. A. Brown.
Normania.....	Herman Folkerts.
Adriatic.....	H. Kessel.
Elba.....	Aubrey Rivard.
Victory.....	Ray Arnold.
Pathfinder.....	Leo Arnold.

PERSONAL.

H. F. Campion, formerly traveling auditor of the O. R. & N. Co., of Portland, Ore., has been appointed superintendent of the Port of Portland towboat service, which is to take over river and bar towing on the Columbia river. This was heretofore done by the O. R. & N. Co.

Smith & Rhuland, Lunenburg, Nova Scotia, launched the schooner Carrie Hirtle Feb. 14. She is owned by Capt. James Hirtle.

Launching the Eugene J. Buffington.

The bulk freighter Eugene J. Buffington was launched at noon on Saturday last at the Lorain yard of the American Ship Building Co. The freighter is building for the Pittsburg Steamship Co., and is named in honor of the president of the Illinois Steel Co. She was christened by Mrs. Buffington. The day was an ideal one for a launching and all things conspired to make the event a gala one. The launching party were taken from Cleveland to Lorain on a special car and returned immediately after the

Building Co., a circumstance from which he derived considerable banter. He proposed a toast to Mrs. Buffington and then called upon Mr. Buffington to reply.

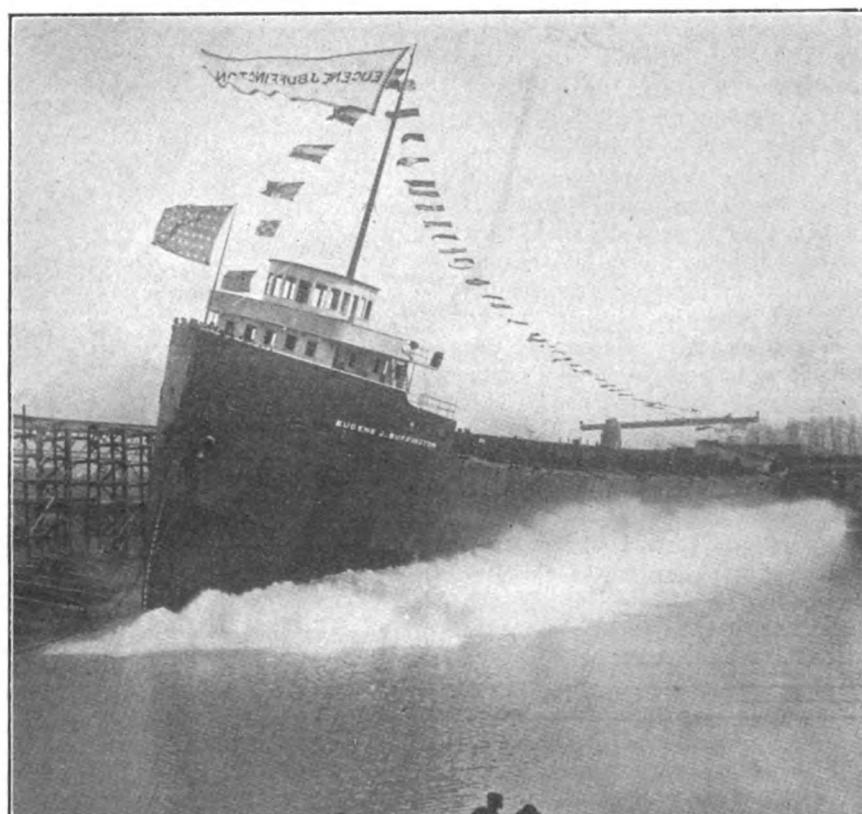
Mr. Buffington acknowledged a deep sense of pride in having a steamer bear his name. He thought a ship to be synonymous of the dust qualities of man. She is entrusted with his treasures and plays a large part in the affairs of commerce. He realized that the purpose behind the launching of a ship was that of service and when a

Mr. Wallace, in his remarks dealt with facts. He referred to the present depression in lake ship building and felt that there was slight warrant for it. He did not think that the limit of size had been reached on the lakes by any means, saying that Harland & Wolff are now building for the White Star line two steamers, the Titanic and Olympic, to be 1,000 ft. long, 93 ft. beam and 69 ft. deep. He felt that the time was rapidly coming when lake construction would approximate these figures and predicted a ship 800 ft. long, 65 ft. beam and 35 ft. deep. He felt that lake business was still in its infancy and would increase rapidly in the future. Great as the commerce of the lakes now is he felt that it had only just started. He believed the Buffington to represent the highest type of construction that has been turned out so far, stating that this company had had the British Lloyds send over men to investigate their methods of construction and that they had reported that they did not believe that anywhere in the world were ships so well constructed for their special trade as they were on the great lakes. He concluded by saying that the Buffington was the highest example of this special type and that the American Ship Building Co. had taken her at so low a figure that they had lost money in her construction.

Mr. Hoyt apologized for Mr. Wallace's loose business practices, saying that it was only through the enormous volume of orders, at those prices that they made any profits. He then introduced Mr. Coulby and expressed the hope as counsel for the Pittsburg Steamship Co. that it would surely get title to the boat by paying the remainder owing on the contract.

Mr. Coulby stated that Mr. Wallace was clever in many ways, but that he shone in his specialty of rendering first aid to the injured. Occasionally a ship goes on the rocks and the company fears that it may lose her. It is then Mr. Wallace appears and assures them that the ship can be saved. He takes her into dry dock and repairs her just as good as new. Then the bill comes in and the company realizes that while it didn't lose the ship, it came pretty close to it.

In his tribute to Mr. Buffington Mr. Coulby stated that Mr. Buffington is not alone president of the greatest and most modern steel plant in the world that has latterly been constructed on the sand dunes of Indiana, but has



THE BULK FREIGHTER EUGENE J. BUFFINGTON LEAVING THE WAYS.

launching to the Union Club where luncheon was served.

Of all the numerous functions that have followed lake launchings of late years this was one of the most enjoyable. The dining room was beautifully decorated, the tables being strewn with roses.

James H. Hoyt was introduced as toastmaster by President James C. Wallace, of the American Ship Building Co. It might be stated that Mr. Hoyt is counsel for both the Pittsburg Steamship Co. and the American Ship

thing designed for service had been named after him it carried with it a higher sense of duty, a larger service to mankind.

Mr. Hoyt stated that the ship ostensibly belonged to the Pittsburg Steamship Co., but that title still remained with the American Ship Building Co., and would so remain until final payment had been made. This he felt bold to state as counsel for the American Ship Building Co. He thereupon introduced James C. Wallace, president of that company.

charge also of building a model city and of giving his best thought in constructing that city towards improving the condition of the workingman.

"And I would prefer," concluded Mr. Coulby, "that it is so, that reason more than for any other that we build and name a ship after him."

Capt. Jollie, who is to command the Buffington, made a brief speech, hoping that he would have as good success with her as he had had with the Gary. He did not have a single accident during the four years in which he was in the Gary.

Harvey D. Goulder in referring to present conditions said that prosperity had not departed but that things are only halting. He thought that industry is primed for a revival and that presently everything will be well under way again. He felt that everything that entered into a state of prosperity was straining at the leash and when loosed would enter it with force. He was sure that the Eugene J. Buffington would enjoy her share of this business.

Andrew Squire struck a responsive chord when he voiced his regret that the bill to aid American shipping had been defeated in the house of representatives. "For this," said he, "we have to thank our neighbor and friend, Mr. Burton. I am sorry that he saw things in the light that he did. While the American Ship Building Co. is not specially concerned in this bill, I am hoping that the time will speedily come when ships flying the American flag will be seen in all the seas of the world and that a just proportion of them will be the handiwork of the American Ship Building Co. It would be a source of particular pride to us if ships were built in this city to fly the American flag in all parts of the globe. I have been much interested to note that all the aspirants for Mr. Burton's place in congress have publicly announced themselves in favor of the shipping bill, and I am wondering how he takes it."

Mr. Hoyt arose instantly in response to Mr. Squire's remarks.

"I admit the neighbor but deny the friend," said he. "Mr. Burton does not represent his district, and he will presently hear from a variety of sources exactly how his action is regarded. This subject is one that lies closely to the heart of every American citizen. It is a national disgrace which is crying aloud for a remedy. At a recent meeting in New York Mr. Joseph G. Butler Jr., president of the Merchant Marine League of the United States, who had latterly returned from Europe, said that he had

traveled in all parts of the world and that he saw the American flag but once, and that was flying at the stern of a Standard Oil barge. I hope that conditions will speedily develop to permit the example of the much despised Standard Oil Co. to be emulated."

Hermon A. Kelley took his auditors back to biblical times, giving the dimensions of the ark and proving that Mr. Wallace was a sounder and better shipbuilder than Noah.

The dinner was brought to a close by Mr. Hoyt in the most impressive manner. Referring to the remarks of Mr. Goulder that industry was tugging at the leash, struggling to be loosed, he said that on March 3 President-elect Taft (adding in parenthesis, "Now president, thank God") in speaking of his predecessor's desire for reform said that he was impartial of legal procedure but that eleven years' service on the bench had given his respect for the law and that reforms, however urgent, could await the action of the law and that no just reform had need to fear the exercise of law. He proposed a toast to be drunk standing and in silence to the president of the United States, expressing the hope that he would occupy the White House for the next eight years.

Those present were: Mr. and Mrs. Eugene J. Buffington, George Baker and W. J. Fuller, Chicago; Mr. and Mrs. James H. Hoyt, Mr. J. C. Wallace, Mr. Russel C. Wetmore, Mr. Harry Coulby, Mr. and Mrs. Harry Dalton, Mr. and Mrs. Hermon A. Kelley, Mr. and Mrs. W. C. Root, Dr. and Mrs. D. Hobson, Mr. and Mrs. E. C. Collins, Mr. John R. Scott, Capt. John Mitchell, Mr. Harvey D. Goulder, Capt. and Mrs. Richard Jollie.

The Buffington is a duplicate of the Dinkey and is 600 ft. over all, 580 ft. keel, 58 ft. beam and 32 ft. deep.

PUGET SOUND NAVY YARD RECEIVES LARGE APPROPRIATION.

According to the latest reports from Washington regarding the naval appropriation bill the Navy Yard, Puget Sound, will fare better than any other yard in the United States proper at the hands of the present congress. The only United States navy yard which will receive a larger appropriation is the one at Pearl Harbor, Hawaii, where the largest drydock in the world is to be constructed. The present indications are that the Puget Sound yard will this year receive the largest appropriation in its history, amounting to approximately \$1,251,000.

Word has been received from Washington that the conferees of the house

and the senate have agreed that none of the items now on the naval bill for the Puget Sound yard will be tampered with. The figures given above do not include the monthly running expenses of the yard, which last year amounted to nearly \$2,000,000.

The principal appropriations for this yard are as follows: \$400,000 to continue work on drydock No. 2; \$40,000 for a new pattern shop; \$18,000 for new officers' quarters; \$8,000 for a water system; \$10,000 for extension of the yard railway system; \$260,000 for a new general storehouse; \$75,000 for a new freight pier to be known as pier No. 8; \$150,000 for a new marine barracks; \$60,000 for marine officers' quarters, and \$260,000 for maintenance of the yard.

DRILL BOAT FOR EMPIRE ENGINEERING CORPORATION.

The powerful steel drill boat built by the Empire Ship Building Co. for the Empire Engineering Corporation of New York, was launched at 3 o'clock, March 3, at the ship building company's yards at the foot of Genesee street, Buffalo, N. Y.

Miss Alice Maud Clark, sister-in-law of F. W. Altan, local manager of the Empire Engineering Corporation, acted as sponsor for the vessel and broke a bottle of wine across the prow as the vessel slid from the ways. The new boat will be used for barge canal work.

The new drill boat is considered the most improved type of that class of craft, and will be about the most powerful drill boat in existence when completed. A craft very similar to it was constructed some time ago by the Empire Ship Building Co., for the Buffalo Dredging Co., and this was the largest of its kind. The new boat is built along the lines of that of the Buffalo Dredging Co.'s vessel. It is 147 ft. in length, 36 ft. in width, and 6 ft. 6 in. deep, having a steel deck house 13 ft. high extending through the middle of the entire length. It will be equipped with five powerful drills of the latest type, which will be operated by steam. The boiler is of the marine type, 18 ft. 6 in. long by 12 ft. 6 in. in diameter. The vessel will be electrically lighted and the anchors and capstans will be operated by steam engines. It will have a crew of 18 men for a shift.

The Empire Ship Building Co. has established a new record in time for constructing the craft, having built this vessel in 41 working days, and ship builders consider this record remarkable.

Modern Methods of Lake Navigation for the Beginner.

BY CAPT. GEORGE TRIMBLE.

Latitude.

The earth is divided by imaginary lines running both north and south and east and west. These lines are for the purpose of location of places, etc. The lines running north and south are meridians of longitude and the lines running east and west are parallels of latitude. If you were told that a certain place was at latitude 40 and longitude 20 you would look for it where the east and west line marked 40 crosses the north and south line marked 20.

Thus—

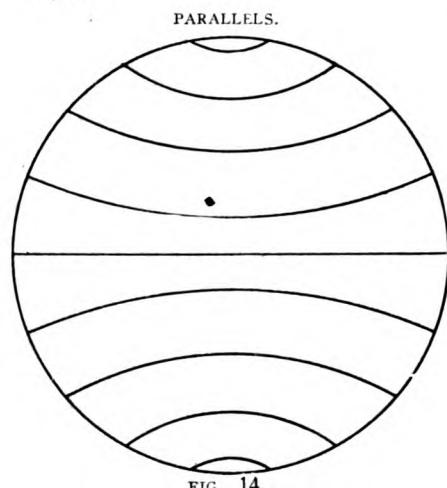


FIG. 14.

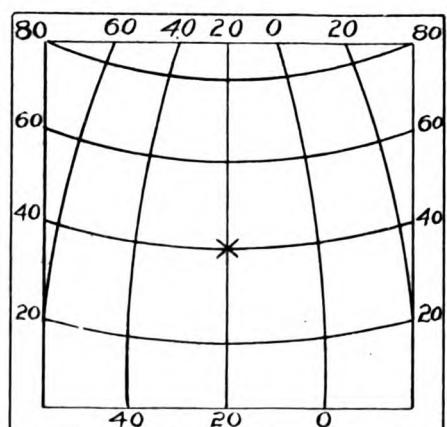


FIG. 16.

Now in figuring for latitude and longitude there must be a place selected to place the first lines. Then the other lines figure from here. All figuring for latitude and longitude is done in degrees and parts of a degree. Every circle has 360 degrees. Therefore as the parallels of latitude go clear around the earth each line

is 360 degrees long. But the meridians of longitude are only 180 de-

grees long. They go only from pole to pole and this makes just half a circle.

We will illustrate these lines by using a ball to represent the earth and mark the lines on ourselves.

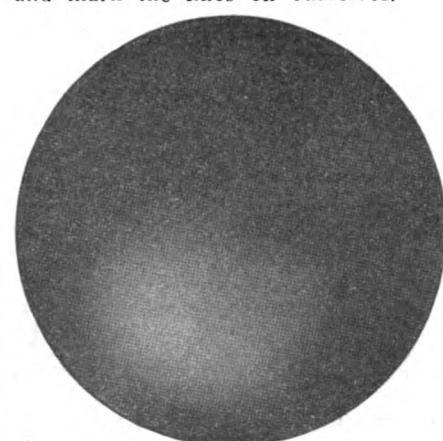


FIG. 17.

Fig. 17 illustrates how our ball looks with no lines on it.

We have now marked a north and south pole on our ball (Fig. 18) and divided it in the middle with a line that runs exactly east and west. This line is the equator and is a starting point for figuring latitude. Anything north of this line is in north latitude and anything south of it is in south latitude.

We have now drawn several parallels of latitude on our ball, Fig. 19. You can set them any distance apart you wish. Remember it is just 90 degrees from

the equator to either pole. The Great

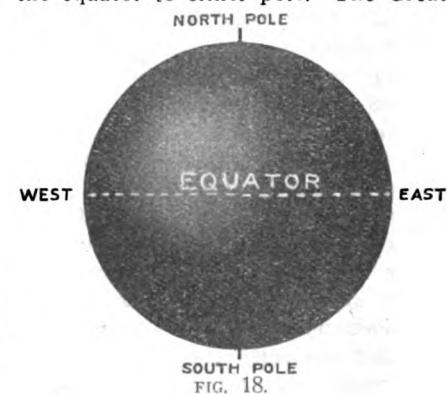


FIG. 18.

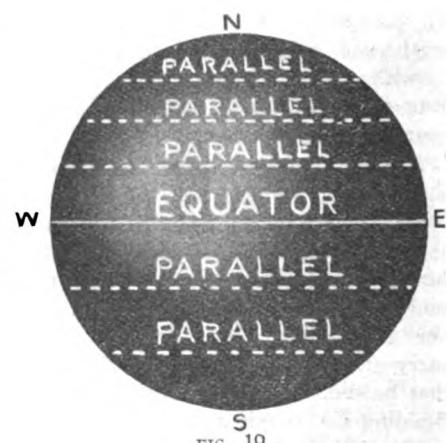


FIG. 19.

Lakes are between latitude 41 and 49 north of the equator.

We now show some meridians of longitude on our ball, Fig. 20. The first meridian is called

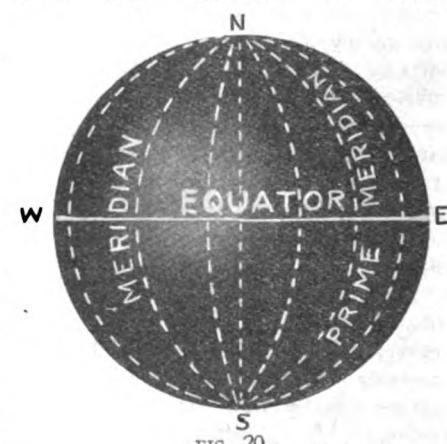


FIG. 20.

the prime meridian and is marked 0. Then if you travel west the longitude is called west longitude until you get half way around the ball (to the 180th meridian). Then it is east longitude for the other half.

The first meridian on the earth passes through Greenwich, England. Greenwich is a suburb of the city of London. The Royal Observatory is situated there and all figures and calculations used in the Nautical Almanac are figured by time shown at Greenwich.

We now show a cut of the earth as she would appear marked off in parallels of latitude and meridians of longitude—Fig. 21. The Equator is the starting point for latitude and the deep black line shows the first meridian of longitude. The great lakes are between latitude 40 and 50 north and between 75 and 95 west longitude.

You will notice that parallels of

time. Sun time is time shown by the sun. When the sun is exactly on your meridian (on the north and south line that passes through where you stand) it is then noon by sun time. But it can't then be noon at any other place. If you were at Cleveland at noon by sun time it is past noon at Fairport and not yet noon at Lorain. The sun in traveling west takes noon with it wherever it goes. So every place east or west will have a different sun time. Sun time used to be the only time used but when railroads began to cut through our country this sun time was found very inconvenient. How could time tables be made where every city

You will notice that four meridians pass through this map. One passes through each section. Now in choosing a time to be used in these four sections they chose the time of these four meridians. Now to show you the connection between time and longitude.

The sun's rays travel completely around the earth every 24 hours. As every circle has 360 degrees the sun then travels 360 degrees in 24 hours. This is at the rate of 15 degrees every hour. When the sun is directly on the first meridian (the meridian that passes through Greenwich, England) we will start a clock. It is then noon by sun time. In exactly one hour the sun has traveled west and is directly over the 15th meridian. In another hour it is directly over the 30th meridian and so on. Therefore every fifteenth meridian is called a standard meridian. Four standard meridians pass through the United States—the 75th, the 90th, the 105th and the 120th (see standard time map). The time of these four standard meridians was chosen for the standard time to be used in the United States. As we said before, it is noon, by sun time, when the sun is exactly over the first meridian at Greenwich. In exactly one hour it is noon, by sun time on the 15th meridian. In exactly five hours from the time the sun left Greenwich it is over the 75th meridian and in six hours it is over the 90th meridian. The 75th and the 90th meridians pass through the region of the Great Lakes. The time of the 75th meridian is chosen for Eastern Standard time and the time of the 90th meridian is chosen for the Central standard time. Now when it is noon by Central standard time the sun is exactly over the 90th meridian.

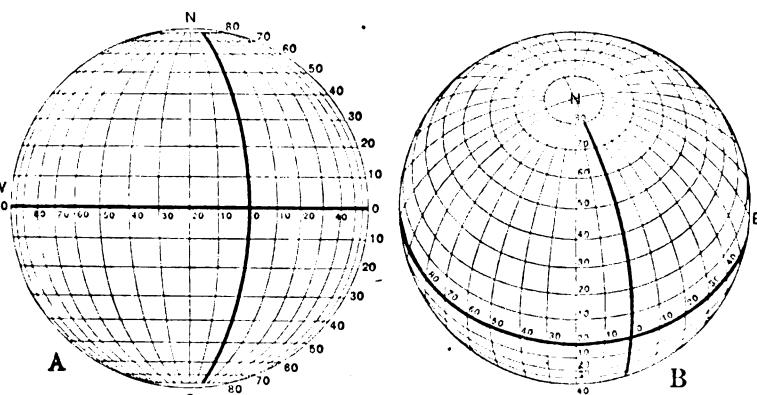


FIG. 21.

latitude are the same distance apart for their whole length. But meridians of longitude are farthest apart at the equator and gradually come together at the pole. One degree of latitude is 60 nautical miles everywhere. A degree of longitude is 60 nautical miles at the equator, but only about 42 nautical miles in the region of the Great Lakes.

Now, as we have said before, we have to know what latitude is in order to find the latitude of our ship as is required to find the azimuth in the book. But we do not have to know the longitude of our ship to get an Azimuth. However, as there is a connection between time and longitude we have also told you what longitude is. While longitude is still fresh in our memory we will take up the subject of time.

Time.

For taking bearings of the sun we must have sun time. But we carry a watch that shows either Central or Eastern Standard time and have to figure sun time from that. You might wonder why we do not carry a watch that is set to sun time and save figuring. This would not be possible unless you remained in one place all the

had a different time? In 1883 an agreement was made to make Standard time. Instead of having a different time at every city it was decided to divide the United States and Canada into four sections with one time for every section. Beginning at the east side of the country the time was named, Eastern Standard time, then Central Standard time, Mountain Standard time and Pacific Standard time. The country was divided as follows:

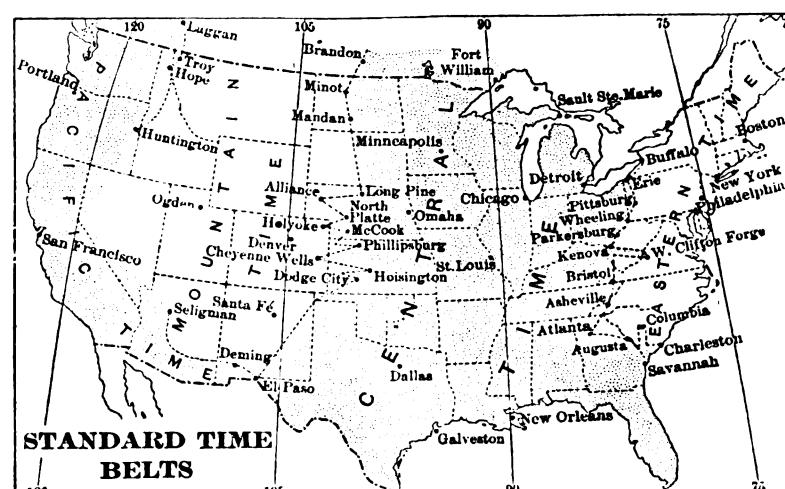


FIG. 22.

By sun time it is therefore noon only on the 90th meridian. It is much past noon, by sun time, at Cleveland, but it is just noon at Cleveland, by Central standard time. At every place on the lakes, from Duluth as far east as Conneaut, it is noon, by Central standard time, at exactly the same time. So in order to turn our standard time into sun time we have to make "Correction for longitude," which really means "Correction for standard time." When our watch shows noon at Cleveland by Central standard time, we must find out how far the sun has gone past Cleveland. We have shown before that the sun is on the 90th meridian. But Cleveland is between the 81st and 82d meridian. As the sun travels westward at the rate of one degree in four minutes she therefore passed the meridian at Cleveland 33 minutes before. So when it is noon at Cleveland by standard time it is 12:33 by mean sun time.

But at Duluth the sun time is slower than standard time because Duluth is west of the 90th meridian and the sun has not yet arrived there. A list is prepared showing just how much should be added or subtracted from Standard time to turn it into mean time. This list is found under the head of "Pelorus Cards."

Now when we have figured our standard time into mean sun time we still have another correction to make to get Apparent sun time. Apparent time is the exact time shown by the sun. Mean sun time is the time shown by a sun-time clock or watch.

If the sun made its trip around the earth every day in exactly the same time we have no need for any more corrections, but she is very unsteady with her trips. Sometimes it takes her longer than 24 hours and sometimes she gets around in less than 24 hours. Now a clock can't be made to run in this unsteady fashion. A good timepiece will show noon at the same time every day, but where would the sun be this day—she might be a few minutes late or a little ahead of time. But no matter what the clock might show the sun must be exactly on the meridian in order to have true sun time. Fortunately, astronomers can tell us just how much late or early the sun will be for each day and they supply us with a list called

Equation of Time.

The time shown by the clock is called mean sun time. We can change this into true (or apparent) sun time by adding or subtracting the number of minutes shown in the table of Equation of Time. All calculations of

the sun are figured by True Sun time.

A table of Equation of time is here shown and is also given under the head of "Pelorus cards."

same manner that the earth is. These lines are made to correspond with the lines on the earth. The equator in the heavens is directly over the earth-

EQUATION OF TIME.

This table is computed to the nearest minute and is sufficiently correct for use in taking Azimuths from the Red Book.

Date of month	Jan. Mean Time	Feb. Sub- tracted from Mean Time	Mar. Sub- tracted from Mean Time	Apr. Sub- tracted from Mean Time	May Mean Time	June Mean Time	July Sub- tracted from Mean Time	Aug. Sub- tracted from Mean Time	Sept. Mean Time	Oct. Mean Time	Nov. Mean Time	Dec. Mean Time
1	3	14	13	4	3	3	3	6	0	10	16	.11
2	4	14	13	4	3	2	4	6	0	10	16	11
3	4	14	12	4	3	2	4	6	0	11	16	10
4	5	14	12	3	3	2	4	6	1	11	16	10
5	5	14	12	3	3	2	4	6	1	11	16	9
6	6	14	12	3	3	2	4	6	1	12	16	9
7	6	14	11	2	4	2	4	6	2	12	16	8
8	6	14	11	2	4	1	5	6	2	12	16	8
9	7	14	11	2	4	1	5	5	2	13	16	8
10	7	14	11	2	4	1	5	5	3	13	16	7
11	8	14	10	1	4	1	5	5	3	13	16	7
12	8	14	10	1	4	1	5	5	4	13	16	7
13	9	14	10	1	4	0	5	5	4	14	16	6
14	9	14	10	1	4	0	5	5	4	14	16	6
15	9	14	9	0	4	Sub.	6	5	5	14	15	5
16	10	14	9	Add	4	0	6	4	5	14	15	5
17	10	14	9	0	4	0	6	4	5	14	15	4
18	10	14	8	1	4	1	6	4	6	15	15	4
19	11	14	8	1	4	1	6	4	6	15	15	3
20	11	14	8	1	4	1	6	3	6	15	14	3
21	11	14	8	1	4	1	6	3	7	15	14	2
22	12	14	7	1	4	2	6	3	7	15	14	2
23	12	14	7	2	4	2	6	3	7	15	14	1
24	12	14	7	2	3	2	6	3	8	16	13	1
25	12	13	6	2	3	2	6	2	8	16	13	0
26	13	13	6	2	3	2	6	2	8	16	13	1
27	13	13	6	2	3	3	6	2	9	16	13	1
28	13	13	5	2	3	3	6	1	9	16	12	1
29	13	13	5	3	3	3	6	1	9	16	12	2
30	13	13	5	3	3	3	6	1	10	16	12	.2
31	13	13	5	3	3	3	6	1	10	16	12	3

When you are told that the sun's rays do not make perfect trips around the earth you might think the earth does not turn steadily—like a poorly balanced wheel. But she does turn in perfect time. The trouble is caused principally by the fact that the earth does not travel in a perfect circle in her yearly revolution around the sun. At certain times she is two million miles closer to the sun than at other times. You can easily understand that the farther away an object is the slower it changes its bearing. Therefore, on account of the varying distance, the sun can not be a perfect mark to time the earth's daily whirl.

You remember that we required to know three things in order to be able to find the correct azimuth in the book. These were—the correct sun time, the latitude of the ship, and the declination of the sun. We still have to find out what Declination is.

Declination.

We locate places on the earth by latitude and longitude. We locate heavenly bodies by declination and right ascension. We would have understood better had they called it heavenly latitude and heavenly longitude. If the sun is in declination 20 she is directly over latitude 20 on the earth. For the purpose of location of heavenly bodies the heavens must be divided up with imaginary lines in the

ly equator. And declination starts at this equator and figures north or south in the same manner you figure latitude. The sun comes north of this equator in the summer and goes south of it in the winter. It crosses the equator about March 21st and comes north until it gets to about declination 23 when it starts back again, crosses the equator about Sept. 21st and goes to about 23 south declination, when it wheels around and starts back again. The sun never gets far enough north to shine directly down on us. The great lakes are all between latitude 40 and 50, while the sun comes only to latitude 23.

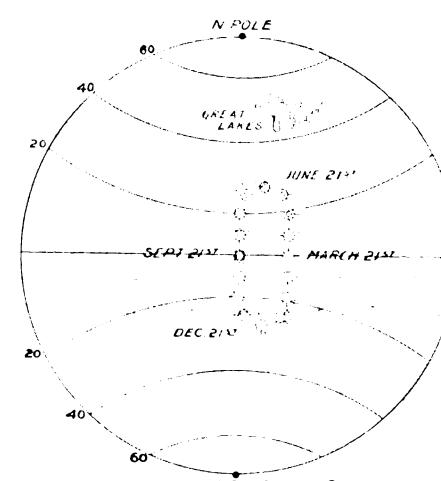


FIG. 23.

Fig. 23 shows a cut of the earth with the equator dividing it in half. The position of the Great Lakes is shown. The sun is shown crossing the equator and coming north and then going back again. The Great Lakes being north of the equator are always in north latitude but the sun is in north declination only part of the time. She then crosses the equator and goes into south declination. When your ship's latitude is north and the sun's declination is north you look for the azimuth where it reads "Declination—Same as—Latitude." But when your ship's latitude is north (as it always is on the great lakes) and the declination of the sun is south then you look in the book for the azimuth where the head of the page reads "Declination—opposite to—Latitude."

In the foregoing cut we mean that the sun's rays fall directly on the earth at the places and time shown. The sun, in the heavens, is crossing the Celestial equator at the same time its direct rays are crossing the earthly equator. The Celestial equator is called the Equinoctial. It is very easy to find the declination of the sun for any day in the year. The list given below will give you this information or you can get this, and all the other data you need on one of our Pelorus cards. See "Pelorus cards." These cards are simply all the data we need pasted on a card. We refer to the card when we take bearings—no need to lose much time finding latitude, declination, correction for Standard time, Equation of time, etc., everything is right at hand.

Table of Declinations of the Sun.

In the Red Book of azimuths bearings are given only for heavenly bodies that come as far north as declination 23 or as far south as declination 23. In the Henrich book of azimuths bearings of heavenly bodies that come as far north as 29 declination can be taken. Therefore all the stars and planets that we use must be to the southward of us. However, on account of their great distance from us home stars that we can use appear to us to be much farther north than they really are. It takes an immense amount of labor to prepare azimuths and for this reason no azimuth book has been published that will give you bearings of stars that are in any part of the heavens. The sun, moon and planets never come farther north than declination 23, so the tables can always be used for them. And so many good stars lie in this belt of azimuths

that we have all we need for any purpose.

We should now be able to take bearings of the sun. In the next chapter we deal with the stars, how to take bearings of moon, stars and planets, how to figure sidereal time from standard time, how to pick out some good stars for use, and how to distinguish stars from planets—all of which is the most interesting part of the whole work.

But we must now try our hand at taking bearings of the sun to see if we have thoroughly mastered it. Some say they would be afraid to put much dependence in bearings of the sun, as there is so much figuring. They say that if one little necessary item is left out a great mistake would be made. But we can overcome this very easily, and in such a way that a mistake is impossible. For this purpose we use what we call a pelorus slate. It is an old-fashioned school slate with a skeleton of the whole problem scratched into it with some sharp pointed instrument. This prevents the main part of our problem ever being rubbed off. All we have to do each time is to add the necessary figures with a slate pencil. Our pencil marks can easily be rubbed off but the form remains. One side of the slate we will use for taking bearings of the sun and the other side for bearings of the moon, planets and stars.

A Pelorus Slate.

The cut below shows a pelorus slate with the problem scratched in with a sharp pointed instrument in such a way that it cannot be rubbed off. The slate is divided into three parts. The first part is for changing your standard time into apparent time. When we get this apparent time we put it opposite the word time below. From our Pelorus card we get the latitude of the ship and the declination of the sun and put them in their proper place. We now use these three things to get the true bearing from the Azimuth book. We put this true bearing in its proper place and then from our pelorus card we get the variation. This changes our true bearing into a magnetic bearing. We then take a bearing of the sun with our instrument and we find our error at once.

The cut below shows us how our slate looks with the skeleton problem scratched in—

A Pelorus Slate.

In the following tab'e we show part of a Pelorus card. On this you will find all the data you need to fill in the above slate. We will then work a problem and fill in the slate. Under

the head of "Pelorus cards" we show the complete card that can be used for any place on the lakes.

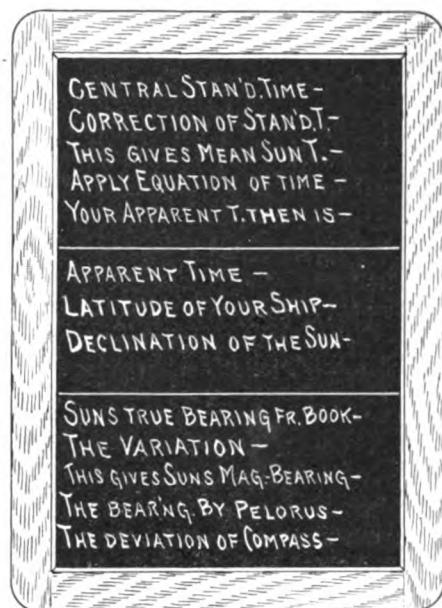


FIG. 24.

Part of a Pelorus Card.

		Latitude	Variation	Correction for Standard Time
Cleveland	42	3° west	Add 30 min.	
Southeast Shoal	42	2° west	Add 30 min.	
Marblehead Pt.	42	1° west	Add 29 min.	
Bar Point				

We will now take a bearing of the sun, at Cleveland, August 22. Our watch showed the time to be 9:18 Central Standard time.

Remember it is not necessary to do any figuring until after you have taken the bearing with your pelorus. You can then retire to your room and let the ship run while you do the figuring. Or you can do your figuring



FIG. 25.

beside the pelorus if you wish. With a little practice you can do the figuring in a few seconds.

Set up your Pelorus, swing the card until it heads the same course as the compass and then take the bearing. For example we will say that your compass gives you a bearing of 136. It must be 136 east because the sun is east of the meridian any time before noon.

Now find the correct Azimuth in the book.

You will find all the data you need on the Pelorus card. Your slate will look like this when filled out—

We have found that our compass deviates 7 degrees to the right or east. Apply this to the left of your course or starboard your boat 7 degrees. Thus—

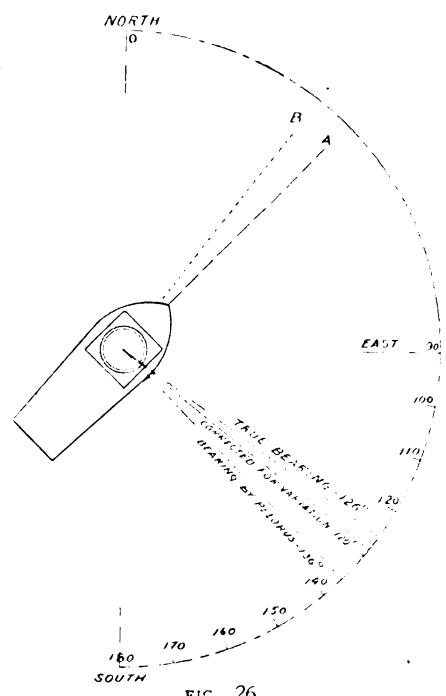


FIG. 26.

Your pelorus has shown the bearing of the sun as 135. But it should have shown the bearing as 129. When

you allow enough to the left to make your bearing show at 129, instead of 136, you also swing your ship from the course A to the course B. You simply starboard your boat 7 degrees.

This shows us how we found our Azimuth in Henrich's book of Azimuths. The pencil lines drawn through the tables show the Azimuth in the corner. The time is 9:48. The ship's latitude is 42 and the sun's rays declination is 12. Our Azimuth is 126.

ATLANTIC COAST NOTES.

Office of the MARINE REVIEW,
Room 1005, No. 90 West St.,
New York City.

The new freight steamer *Gautemala*, of the Compagnie Generale Trans-Atlantique, arrived at New York on Monday, on her maiden voyage from Havre. The *Gautemala* is a 12-knot vessel of 6,200 gross tons and has a carrying capacity of 10,000 tons. She was built at Rouen and engined by a St. Nazaire firm.

The Hamburg-American Steamship Co. will pay no dividend this year, this being the decision arrived at on March 8, at the annual meeting of directors. The decrease in the company's earnings, it was reported, is due to depression in the ocean-carrying trade coupled with the heavy competition forced on the line by the two big Cunarders. The Hamburg-American Co. paid a dividend of 6 per cent last year, the previous year's dividend being 10 per cent.

There can be little doubt that prosperity is returning to the trans-Atlantic passenger trade, a general improvement being reported in all departments of traffic. The Hamburg-American liner *Pennsylvania* arrived at New York last Saturday with 2,016 third-class passengers, this being the largest number of immigrants to ar-

rive at this port on one steamer since the financial depression of 1907. In addition to this large number of third-class there were over 200 cabin passengers.

The New York harbor mail boat Postmaster General, while engaged in unloading mail from the liner *Majestic* at Quarantine last week, was thrown against the steamer and sustained some slight damage by the violence of the weather. The *Majestic* brought 3,914 bags of mail, this being an unusually large number for this season of the year.

The Cunard line steamer *Mauretania* last week established a new record for the east-bound passage from Ambrose channel lightship to Daunt's rock. The entire distance was covered at an average speed of 25.28 knots, the time taken being 4 days, 20 hours and 2 minutes. The best previous record was made by the *Mauretania* on her last trip, when she covered the course of 2,934 miles in 4 days, 20 hours and 27 minutes.

The schooner C. H. Brown, from Savannah to New York, was picked up last Friday five miles northeast of Winter Quarter lightship, in a leaking and helpless condition. She was towed to the Delaware breakwater, her rudder having been broken.

In order to prevent a recurrence of the Heredia accident of last week the United Fruit Company is to establish an extensive system of lights along the Central American coast, through the narrows in that region for the guidance of navigators. Minor C. Keith, vice-president of the company, states that he will endeavor to obtain concessions from the governments of Nicaragua and Honduras, allowing the placing of beacons off the coasts. The *Heredia* ran on a reef at Cape Gracias Bend, off the coast of Nicaragua, making the third such disaster within a year.

The British steamship *Ben Cruachan*, from Sagunto and Palomas, Spain, arrived at Girard Point on Monday and reported having been compelled to burn her cargo of cork owing to her supply of coal running short. The steamer was 26 days making the passage and encountered a succession of gales, going far enough to the southward to sight the Madeira Islands. She burned a combination of coal and cork, having only seven tons of coal in her bunkers when she arrived.

9 hrs. 48 m. to 9 hrs. 16 m.

AZIMUT OR TRUE BEARING.

Time A. M.	Latitude	DECLINATION—SAME AS—LATITUDE.												Time P. M.			
		0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°
H. M.																	
49	129.3	138.8	138.3	137.7	137.2	136.6	136.0	135.4	134.8	134.2	133.5	132.9	132.3	131.5	130.8	130.1	129.4
47	138.4	137.9	137.3	136.7	136.2	135.6	135.0	134.4	133.9	133.3	132.7	132.1	131.5	130.9	130.3	130.0	129.7
45	137.5	137.0	136.4	135.8	135.3	134.7	134.2	133.6	133.0	132.4	131.8	131.2	130.6	130.0	129.4	129.1	128.7
43	136.6	136.1	135.5	134.9	134.4	133.8	133.2	132.6	132.0	131.4	130.8	130.2	129.6	129.0	128.4	128.1	127.7
41	135.7	135.2	134.6	134.0	133.5	132.9	132.3	131.7	131.1	130.5	130.0	129.4	128.8	128.2	127.6	127.3	126.9
49	129.3	136.2	136.7	137.2	137.7	138.2	138.6	139.1	139.6	140.1	140.6	141.1	141.6	142.1	142.6	143.1	143.6
47	137.3	136.8	136.2	135.6	135.0	134.4	133.8	133.2	132.6	132.0	131.4	130.8	130.2	129.6	129.0	128.4	127.8
45	136.4	135.9	135.3	134.7	134.1	133.5	132.9	132.3	131.7	131.1	130.5	130.0	129.4	128.8	128.2	127.6	127.0
43	135.5	135.0	134.4	133.8	133.2	132.6	132.0	131.4	130.8	130.2	129.6	129.0	128.4	127.8	127.2	126.6	126.0
41	134.6	134.1	133.5	132.9	132.3	131.7	131.1	130.5	130.0	129.4	128.8	128.2	127.6	127.0	126.4	125.8	125.2
49	129.3	137.2	137.7	138.2	138.7	139.2	139.6	140.1	140.6	141.1	141.6	142.1	142.6	143.1	143.6	144.1	144.6
47	138.4	137.9	137.3	136.7	136.2	135.6	135.0	134.4	133.9	133.3	132.7	132.1	131.5	130.9	130.3	130.0	129.7
45	137.5	137.0	136.4	135.8	135.3	134.7	134.2	133.6	133.0	132.4	131.8	131.2	130.6	130.0	129.4	129.1	128.7
43	136.6	136.1	135.5	134.9	134.4	133.8	133.2	132.6	132.0	131.4	130.8	130.2	129.6	129.0	128.4	128.1	127.7
41	135.7	135.2	134.6	134.0	133.5	132.9	132.3	131.7	131.1	130.5	130.0	129.4	128.8	128.2	127.6	127.3	126.9
49	129.3	138.8	138.3	137.7	137.2	136.6	136.0	135.4	134.8	134.2	133.5	132.9	132.3	131.5	130.8	130.1	129.4
47	138.4	137.9	137.3	136.7	136.2	135.6	135.0	134.4	133.9	133.3	132.7	132.1	131.5	130.9	130.3	130.0	129.7
45	137.5	137.0	136.4	135.8	135.3	134.7	134.2	133.6	133.0	132.4	131.8	131.2	130.6	130.0	129.4	129.1	128.7
43	136.6	136.1	135.5	134.9	134.4	133.8	133.2	132.6	132.0	131.4	130.8	130.2	129.6	129.0	128.4	128.1	127.7
41	135.7	135.2	134.6	134.0	133.5	132.9	132.3	131.7	131.1	130.5	130.0	129.4	128.8	128.2	127.6	127.3	126.9
49	129.3	138.8	138.3	137.7	137.2	136.6	136.0	135.4	134.8	134.2	133.5	132.9	132.3	131.5	130.8	130.1	129.4
47	138.4	137.9	137.3	136.7	136.2	135.6	135.0	134.4	133.9	133.3	132.7	132.1	131.5	130.9	130.3	130.0	129.7
45	137.5	137.0	136.4	135.8	135.3	134.7	134.2	133.6	133.0	132.4	131.8	131.2	130.6	130.0	129.4	129.1	128.7
43	136.6	136.1	135.5	134.9	134.4	133.8	133.2	132.6	132.0	131.4	130.8	130.2	129.6	129.0	128.4	128.1	127.7
41	135.7	135.2	134.6	134.0	133.5	132.9	132.3	131.7	131.1	130.5	130.0	129.4	128.8	128.2	127.6	127.3	126.9
49	129.3	138.8	138.3	137.7	137.2	136.6	136.0	135.4	134.8	134.2	133.5	132.9	132.3	131.5	130.8	130.1	129.4
47	138.4	137.9	137.3	136.7	136.2	135.6	135.0	134.4	133.9	133.3	132.7	132.1	131.5	130.9	130.3	130.0	129.7
45	137.5	137.0	136.4	135.8	135.3	134.7	134.2	133.6	133.0	132.4	131.8	131.2	130.6	130.0	129.4	129.1	128.7
43	136.6	136.1	135.5	134.9	134.4	133.8	133.2	132.6	132.0	131.4	130.8	130.2	129.6	129.0	128.4	128.1	127.7
41	135.7	135.2	134.6	134.0	133.5	132.9	132.3	131.7	131.1	130.5	130.0	129.4	128.8	128.2	127.6	127.3	126.9
49	129.3	138.8	138.3	137.7	137.2	136.6	136.0	135.4	134.8	134.2	133.5	132.9	132.3	131.5	130.8	130.1	129.4
47	138.4	137.9	137.3	136.7	136.2	135.6	135.0	134.4	133.9	133.3	132.7	132.1	131.5	130.9	130.3	130.0	129.7
45	137.5	137.0	136.4	135.8	135.3	134.7	134.2	133.6	133.0	132.4	131.8	131.2	130.6	130.0	129.4	129.1	128.7
43	136.6	136.1	135.5	134.9	134.4	133.8	133.2	132.6	132.0	131.4	130.8	130.2	129.6	129.0	128.4	128.1	127.7
41	135.7	135.2	134.6	134.0	133.5	132.9	132.3	131.7	131.1	130.5	130.0	129.4	128.8	128.2	127.6	127.3	126.9
49	129.3	138.8	138.3	137.7	137.2	136.6	136.0	135.4	134.8	134.2	133.5	132.9	132.3	131.5	130.8	130.1	129.4
47	138.4	137.9	137.3	136.7	136.2	135.6	135.0	134.4	133.9	133.3	132.7	132.1	131.5	130.9	130.3	130.0	129.7
45	137.5	137.0	136.4	135.8	135.3	134.7	134.2	133.6	133.0	132.4	131.8	131.2	130.6	130.0	129.4	129.1	128.7
43	136.6	136.1	135.5	134.9	134.4	133.8	133.2	132.6	132.0	131.4	130.8	130.2	129.6	129.0	128.4	128.1	127.7
41	135.7	135.2	134.6	134.0	133.5	132.9	132.3	131.7	131.1	130.5	130.0	129.4	128.8	128.2	127.6	127.3	126.9

2 hrs. 12 m. to 2 hrs. 44 m.

THE PAHLOW PATENT HOSE COUPLINGS AND VALVES.

The accompanying illustrations show features of a new hose coupling and valves, which are the invention of Frank C. Pahlow, superintendent of the Ecorse yards of the Great Lakes Engineering Works, Detroit. The coupling allows a full area through the hose and presents no obstruction against which particles of water may lodge and freeze in cold weather and thus choke up the hose with ice. It permits a reduction in the size of hose used to carry a given quantity of air or water, inasmuch as the coupling does not decrease the area offered for passage of

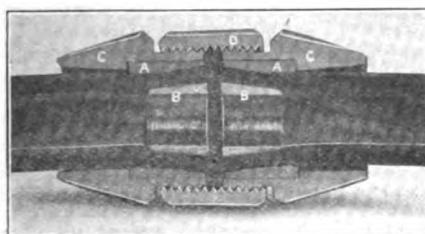


FIG. 1—SECTION OF THE PAHLOW HOSE COUPLING.

the fluid, as is usually the case. This effects a considerable saving in the cost of hose necessary to equip a given plant, as a smaller diameter hose may be used for a given service.

The coupling is also so designed that there can be no leakage of air or water through it, thus increasing the efficiency of pneumatic and hydraulic plants and enabling the use of low pressure at the central station. The illustration, Fig. 1, is a section through the coupling and shows clearly its construction. The tapered ring A is slipped over the end of the hose and a tapered thimble B inserted on the inside, the two being forced together with the hose projecting slightly beyond. The tapered ring C fits inside of the recess on the coupling nut C, allowing it to turn freely. The two

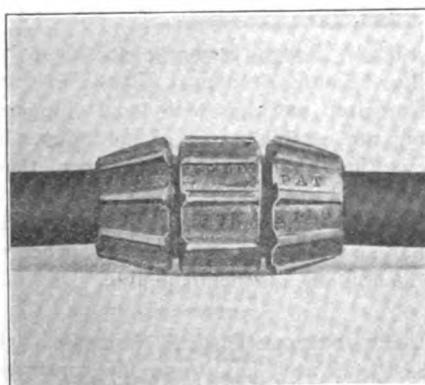
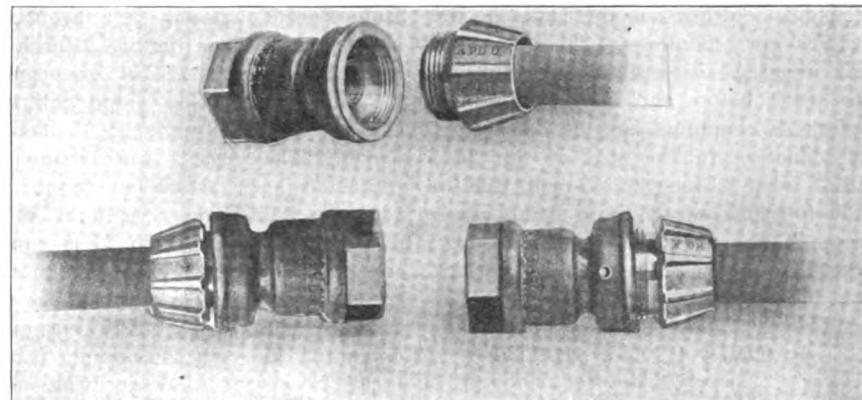


FIG. 2—THE PAHLOW HOSE COUPLING CONNECTED.



FIGS. 3-5—VALVE USED IN CONNECTION WITH PAHLOW HOSE COUPLING.

coupling nuts C are connected then by means of a threaded sleeve D. Turning the nuts C which are free to move around the hose with all the projecting ends of the hose together, making an absolutely tight joint. This construction eliminates all gaskets, and also the use of wire for fastening the hose to the coupling. Fig. 2 shows the coupling made up.

In Fig. 3 is shown a valve operated by the valve nut, which, when screwed up, unseats the valve admitting air into the hose and sealing the joint by means of the projecting end of the hose, as shown in Fig. 4. The valve nut and the coupling nut are exact

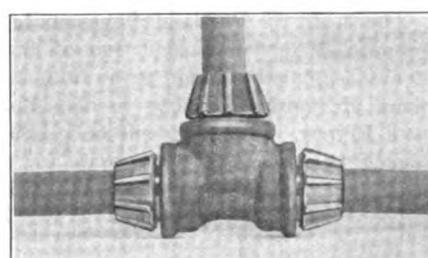


FIG. 6—PAHLOW HOSE COUPLING USED WITH TEE-CONNECTION.

duplicates and may be used either for operating the valve and for forming the coupling. If the valve nut is slackened off, as shown in Fig. 5, the valve becomes seated and closes the air supply. The valve body contains a relief hole shown in Fig. 5, which allows the air to escape from the hose after the valve is seated. It is unnecessary to unscrew the valve nut entirely to shut off the air.

Adaptations of this coupling comprise a reducing coupling for the connecting of different sizes of hose together, a tee coupling shown in Fig. 6, and used in riveting work, where an operator may use alternately a riveting and a chipping hammer. The coupling nut on the main hose is

connected to the tee and also two shorter lengths, to the one which is attached the riveting hammer and to the other the chipping hammer. Fig. 7 shows a manifold connection, as used in the Ecorse yards of the Great Lakes Engineering Works.

Practical results obtained with the use of this coupling at the Ecorse yards where compressed air is used extensively for riveting and chipping hammers and for drills, holders-on and forge fires comprise the cutting down of the operating machinery for furnishing compressed air from two 3,000-foot and one 2,000-foot capacity air compressors to two 3,000-foot machines and the maintenance of a pressure of 90 to 100 pounds instead

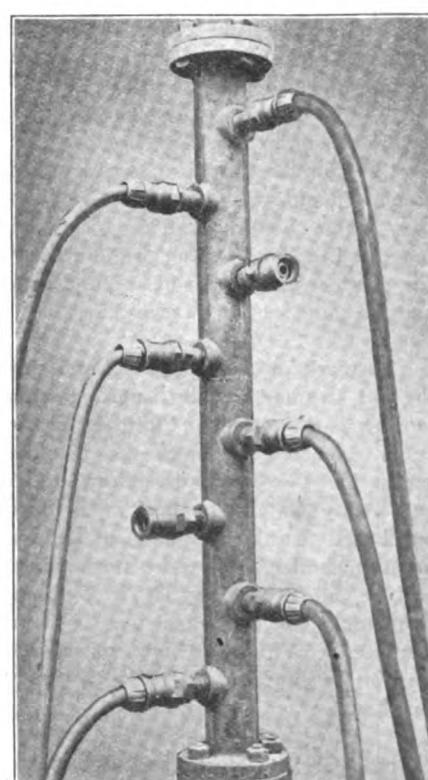


FIG. 7—PAHLOW HOSE COUPLING USED ON MANIFOLD.

of 60 to 75 pounds. This is due entirely to cutting out the leaks in the valves and couplings. The increased air pressure also allows the operators to work better and faster. The use of these couplings has also permitted a reduction in the size of the hose used from $\frac{3}{4}$ -inch to $\frac{1}{2}$ -inch, due to the full area of the hose being available in the coupling. F. C. Pahlow, the inventor, is located at 278 Clark avenue, Detroit.

PACIFIC COAST NOTES.

Office of the MARINE REVIEW,
302 Pioneer Bldg., Seattle, Wash., Feb. 27.

By means of an amendment to the sundry civil bill, the \$140,000 which Pacific coast shipping interests have asked for additional aids to navigation on the Alaska coast has been appropriated by congress. While the coast interests feel that the sum now available is insufficient to provide all the protection to shipping that would be desirable, the appropriation is a big step in the right direction. The money will be utilized to build additional lighthouses, to set out gas buoys, and common buoys, to study tidal currents and otherwise increase the safety of navigation along the Alaska coast.

The cable ship Burnside which recently returned to Seattle after repairing the break in the Alaska cable will prepare at once for a trip to San Francisco, where she will be engaged for some time in laying the cables from the Presidio to Alcatraz, Angel island and other army posts.

The steamer Daring, launched recently from the yards of Crawford & Reid, Tacoma, is now at Caledonia bay, where her cabin fittings are being put in. The Daring will be ready for service on her run between Seattle and Tacoma about March 25.

The work of enlarging and refitting the old steamer Vashon is progressing rapidly at the yards of Philip D. Sloan. It is expected to have the steamer ready for the water by April 1. A new Almy water-tube boiler has been purchased to take the place of the old fire tube boiler. The new stern wheel will be 14 ft. wide by 21 ft. 6 in. in diameter. The old wheel was 18 ft. in diameter. With her new outfit the Vashon is expected to make 17 miles per hour.

The Great Northern Steamship Co.'s liner Minnesota, which is now in port in Seattle undergoing routine repairs will leave outward bound

March 20. The rumor, emanating from Port Townsend, that the Minnesota would clear before March 20 with a heavy cargo of government freight and that she would call only at Manila and Hongkong is officially denied. The reason for setting the Minnesota's departure so far in advance is that business is light at the present time and March 20 is considered an opportune date for tourists to leave for Japan in order to see that country at its best. The reason of extending the route to Manila is that there is prospect of securing more cargo and especially of booking more passengers. The itinerary calls for stops in Japan and at Shanghai, China, from which port the liner proceeds to Manila and then to Hongkong, which remains the oriental terminus.

The army transport Logan has been given a trial trip in San Francisco bay preparatory to her departure for the Philippines, March 8. The trial was in every way satisfactory. The Logan has been practically rebuilt at the Risdon Iron Works.

The steamer Excelsior which has been laid up for the past year has been placed in commission and will take a cargo of lumber from Portland to San Francisco.

The port of Portland have invited proposals for the construction of two steel sea-going bar tugs to be built on plans previously described in the MARINE REVIEW. The bids will be opened March 11 at 4 p. m. Proposals for a steel hull, stern wheel river tug will be received in a short time.

The Weir trans-Pacific line will shortly add the new British steamer Yoserie now on her way around from Philadelphia to Santa Rosia and thence to Puget Sound and the steamer Jeserie, now trading across the Atlantic. The company will operate the four steamers Suverie, Kumerie, Jeserie and Yoserie in a monthly service between Puget Sound ports and Manila.

Construction has been commenced by the British Columbia Marine Railways Co. on a new passenger steamer for the excursion trade on Victoria Arm.

It is stated in San Francisco shipping circles that as a result of the announcement by the new owners of the Union Iron Works that the use of the Hunter's Point dry dock would

be denied to independent concerns, Moore, Scott & Co. are planning to purchase the shipyards of W. A. Boole & Sons, on Oakland creek. Several large firms are contemplating the building of wharves of their own, and the Risdon Iron Works proposes to coffer-dam the steamer Admiral Sampson while that vessel is being repaired.

The new tracks of the Northern Pacific Ry. between Kalama and Vancouver are in such soft shape, due to heavy rainfall, that it is considered unsafe to operate heavy trains over this line and therefore the old ferry across the Columbia between Kalama and Goble may be again pressed into service after it was thought she had been permanently put out of commission.

It is expected that when the weather becomes settled work on the north jetty will be resumed and a full crew will be put at work. A force of 150 men will be needed to carry on the improvements, and six large vessels owned by the Coastwise Steamship & Barge Co. will be in constant use; \$400,000 remains in the fund for the carrying on of this improvement.

Three hundred and sixty-five thousand dollars will be spent by the Northern Pacific railway in improvements to its wharves in Seattle on work now under way or just completed. Permits were taken out recently for improvements to piers 1 and 2 aggregating \$300,000. The improvements will consist of the extension of the two piers from 450 to 750 ft., carrying them to the outer harbor line, as has been done with the Pacific Coast Co. and Colman piers. The extension will rest on creosoted piling and will be more substantial than work done in the past.

B. N. Baker, formerly president of the Atlantic Transport Co., is in San Francisco working with local shippers for the establishment of an independent line of steamships between that port and La Boca. Baker was interested in the proposition by H. S. Bates, who was sent east to procure aid for an independent line.

The Stetson Post & Mill Co., of Seattle, Wash., has begun the construction of a 75-ft. oil-burning tug to be used in connection with the company's milling plant.

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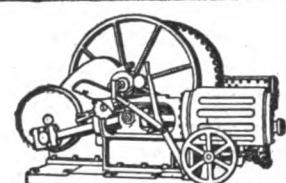
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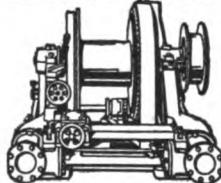
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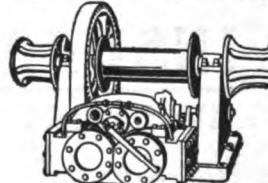
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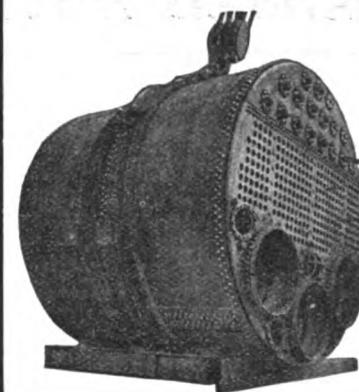
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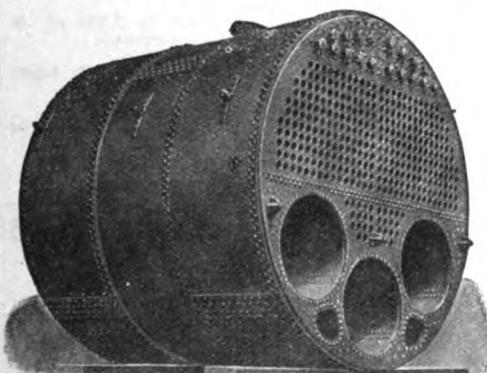
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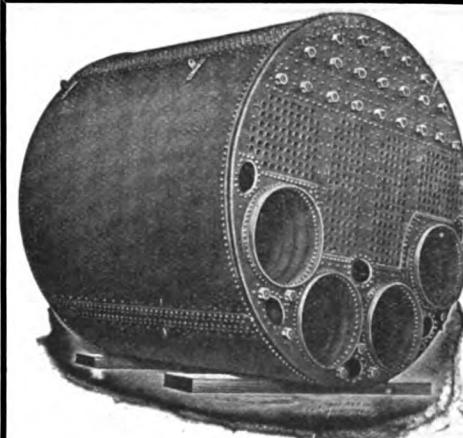
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STEAM BARGE FOR SALE. "VAN Allen" 136 x 26 x 10 ft., good condition and well found, compound engine, boiler 1901. Make offer to Toronto Electric Light Co., Toronto, Ontario.

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U. S. Engineer Office, Detroit, Mich., Feb. 27th, 1909. Sealed proposals for the construction of the superstructure of a movable dam for St. Marys Falls Canal, Sault Ste. Marie, Mich., will be received at this office until 3 P. M., March 30, 1909, and then publicly opened. Information on application. C. McD. Townsend, Lieut. Col., Engrs.

Sealed Proposals will be received at the office of the Light-House Engineer, Buffalo, N. Y., until 11 o'clock, A. M., March 30, 1909, and then opened, for furnishing materials and labor of all kinds necessary for the construction of a light-house and an iron beacon at the entrance to Cleveland Harbor, Ohio.

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